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(12) **United States Patent**
Hardy

(10) **Patent No.:** **US 8,863,963 B2**
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(54) **PRODUCT MANAGEMENT DISPLAY SYSTEM WITH TRACKLESS PUSHER MECHANISM**

USPC 211/59.2, 59.3, 184, 119.003, 74, 211/126.1, 43; 221/227, 255, 279; 312/61, 312/71, 35; 248/309.1; D6/408, 515

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See application file for complete search history.

(73) Assignee: **RTC Industries, Inc.**, Rolling Meadows, IL (US)

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 114 days.

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(65) **Prior Publication Data**

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Related U.S. Application Data

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(63) Continuation-in-part of application No. 12/639,656, filed on Dec. 16, 2009, now Pat. No. 8,322,544, which

RTC Industries, Inc., v. Fasteners for Retail, Inc., and SuperValu, Inc. d/b/a Cub Foods, Stipulation of Dismissal, Civil Action No. 05 C 6940, Apr. 2006.

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(51) **Int. Cl.**

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A47F 7/28 (2006.01)

(74) *Attorney, Agent, or Firm — Banner & Witcoff, Ltd.*

(52) **U.S. Cl.**

(57) **ABSTRACT**

CPC . *A47F 1/126* (2013.01); *A47F 1/04* (2013.01); *A47F 7/28* (2013.01); *A47F 5/005* (2013.01); *A47F 1/12* (2013.01)

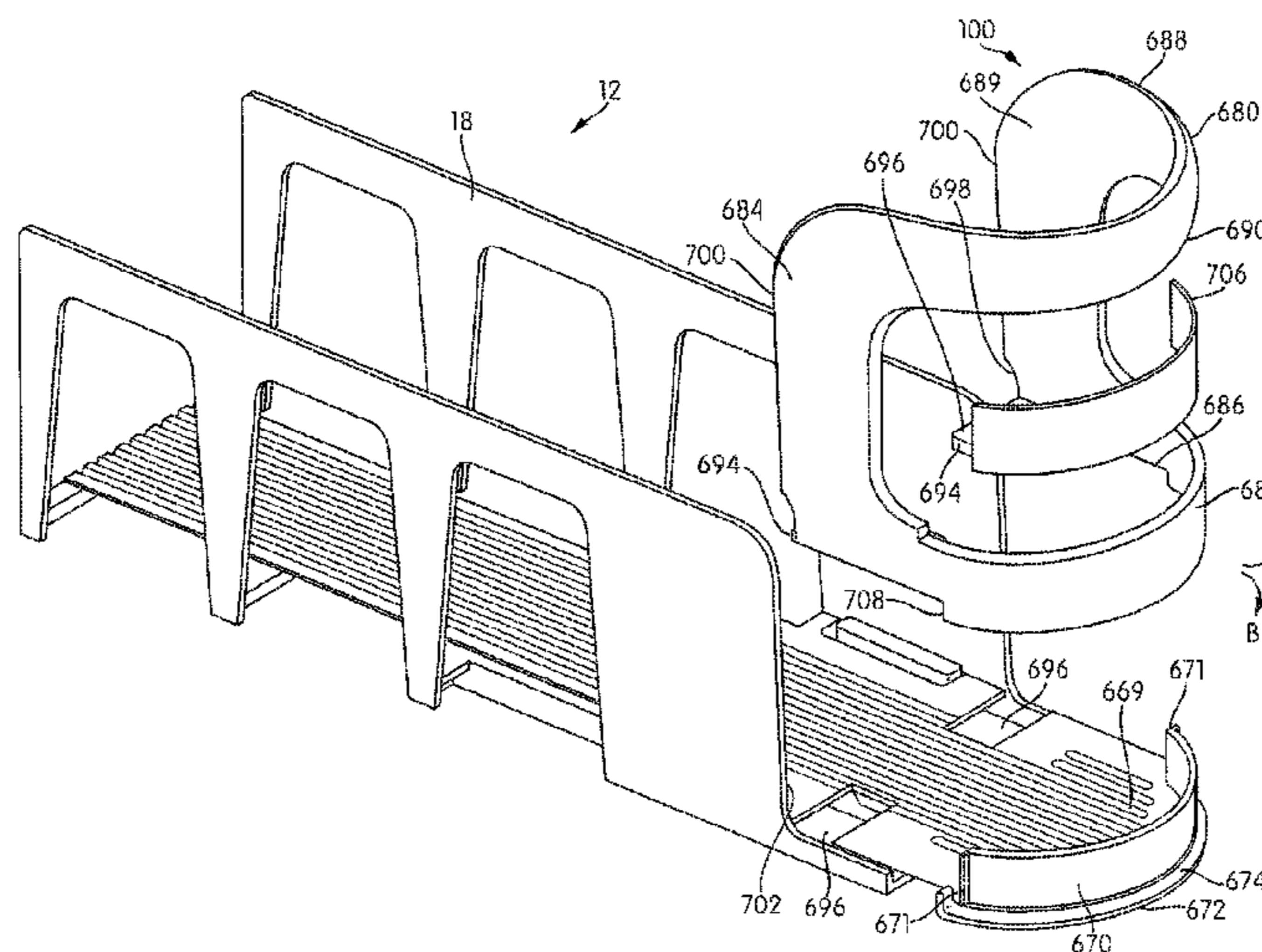
A product management display system for merchandising product on a shelf includes at least one tray having a front rounded portion and defining a plurality of apertures and having two sides. A lip may extend upward from the front rounded portion of the at least one tray. A front shelf may extend forward from the lip. The at least one tray may include one divider extending upwardly from each of the two sides and a front wall. The front wall may include a top wall, a bottom wall, and two side legs. The front wall, bottom wall, and two side legs may form a wall aperture and the front wall may include a plurality of projections configured to engage with the plurality of apertures on the tray.

USPC **211/59.3**; 211/74; 211/119.003

(58) **Field of Classification Search**

16 Claims, 37 Drawing Sheets

CPC *A47F 1/12*; *A47F 1/125*; *A47F 1/126*; *A47F 1/04*; *A47F 1/06*; *A47F 1/065*; *A47F 1/08*; *A47F 1/123*; *A47F 1/00*; *A47F 1/10*; *A47F 7/28*; *A47F 7/285*; *A47F 7/283*; *A47F 5/005*; *A47F 5/0043*; *A47F 3/02*; *A47F 3/0486*; *A47B 73/00*; *A47B 73/006*; *B25H 3/06*; *B25H 3/04*; *B65G 1/07*; *B65G 1/08*



Related U.S. Application Data

is a continuation-in-part of application No. 12/357,860, filed on Jan. 22, 2009, now Pat. No. 8,453,850, which is a continuation-in-part of application No. 11/760,196, filed on Jun. 8, 2007, now Pat. No. 8,312,999, which is a continuation-in-part of application No. 11/411,761, filed on Apr. 25, 2006, now Pat. No. 7,823,734.

- (60) Provisional application No. 60/716,362, filed on Sep. 12, 2005, provisional application No. 60/734,692, filed on Nov. 8, 2005, provisional application No. 61/530,736, filed on Sep. 2, 2011, provisional application No. 61/542,473, filed on Oct. 3, 2011, provisional application No. 61/553,545, filed on Oct. 31, 2011.

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FIG. 1

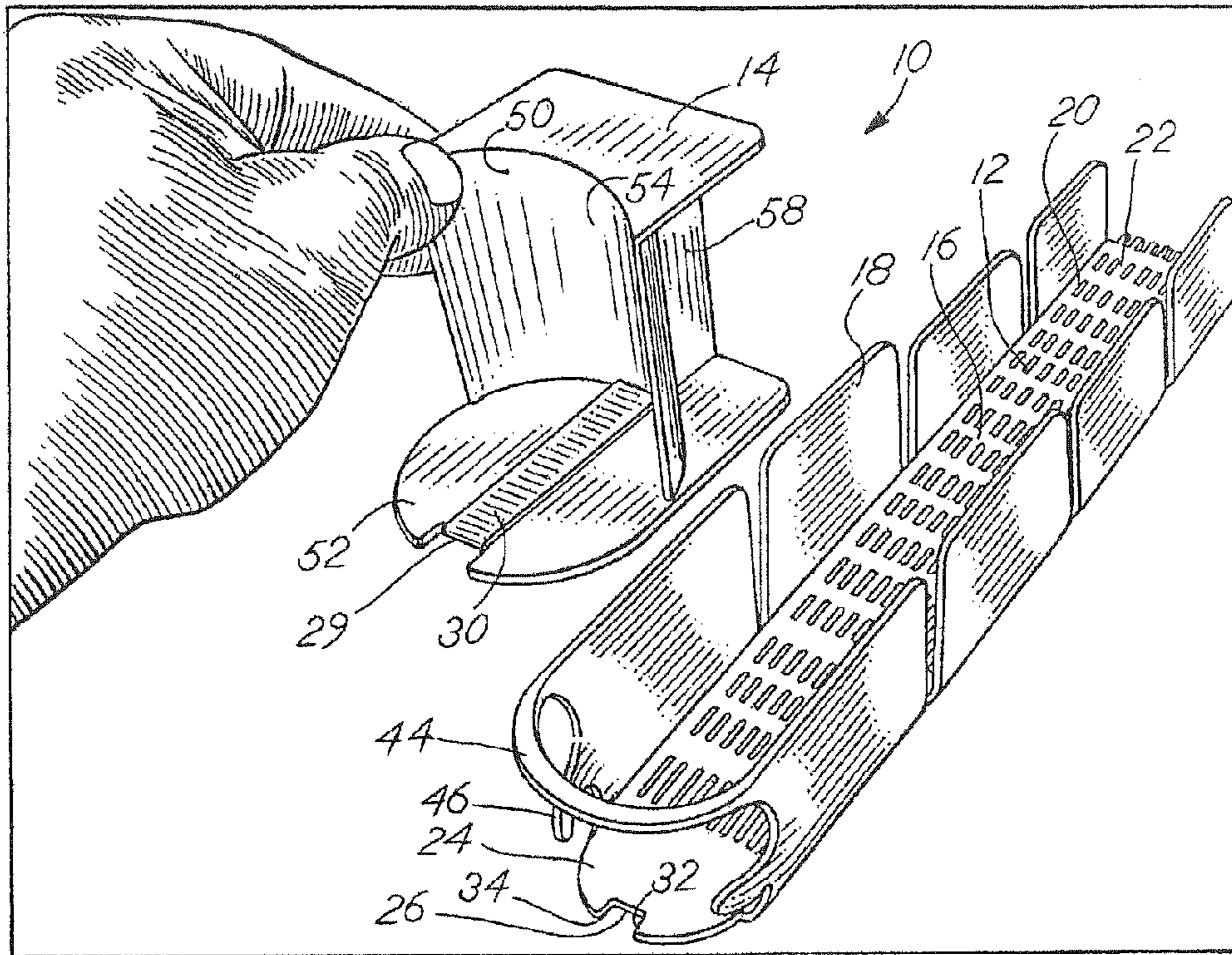
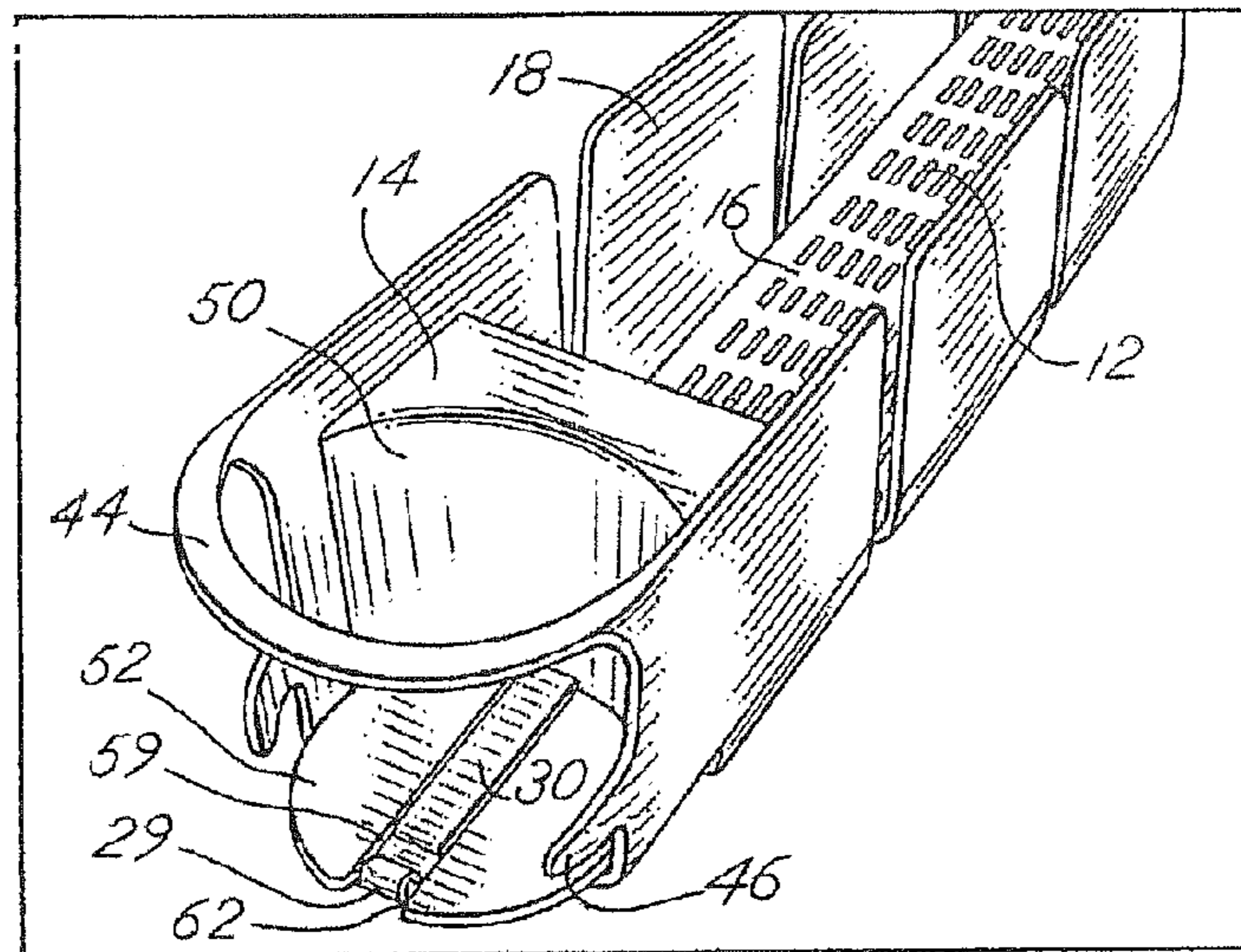
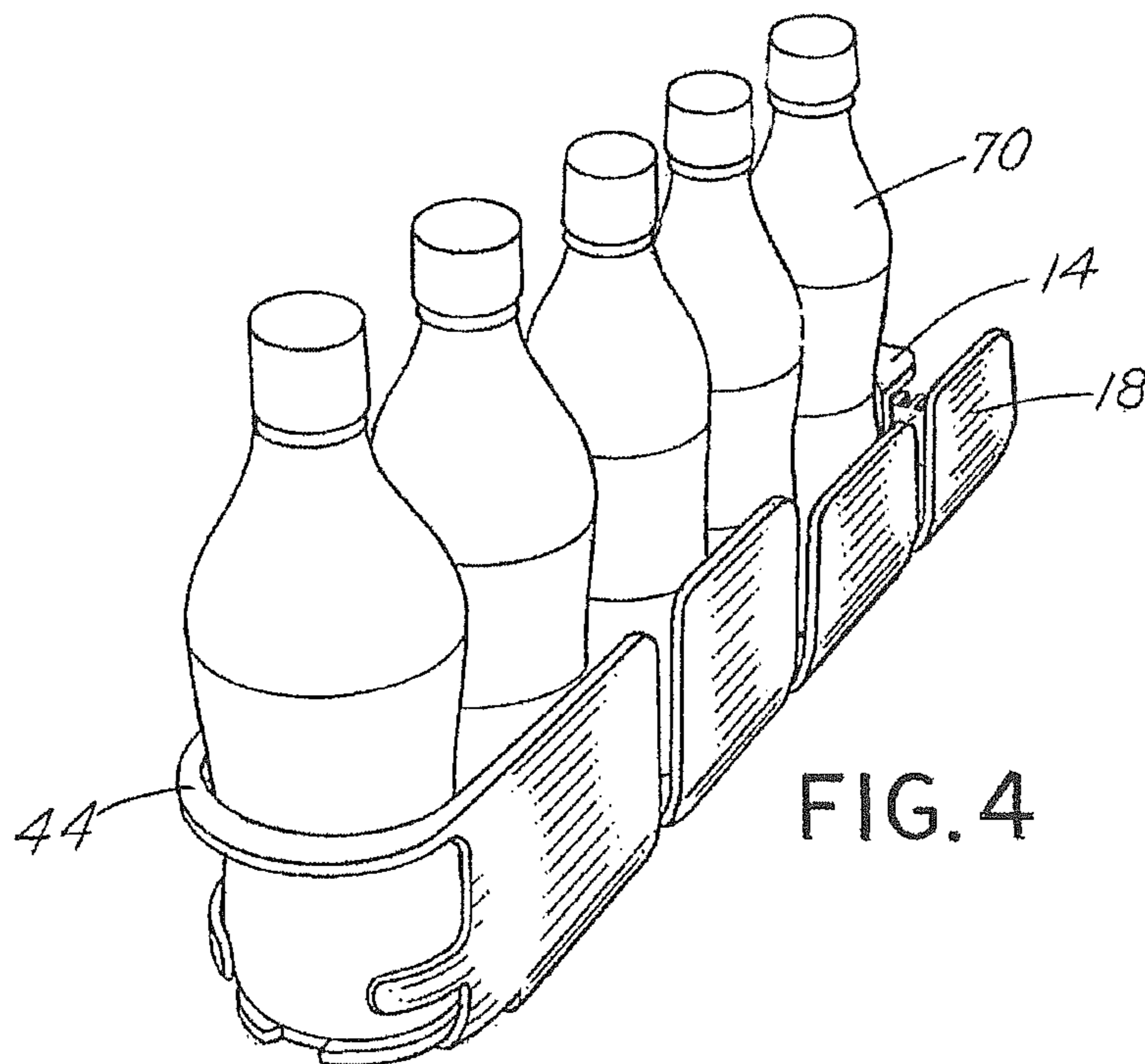
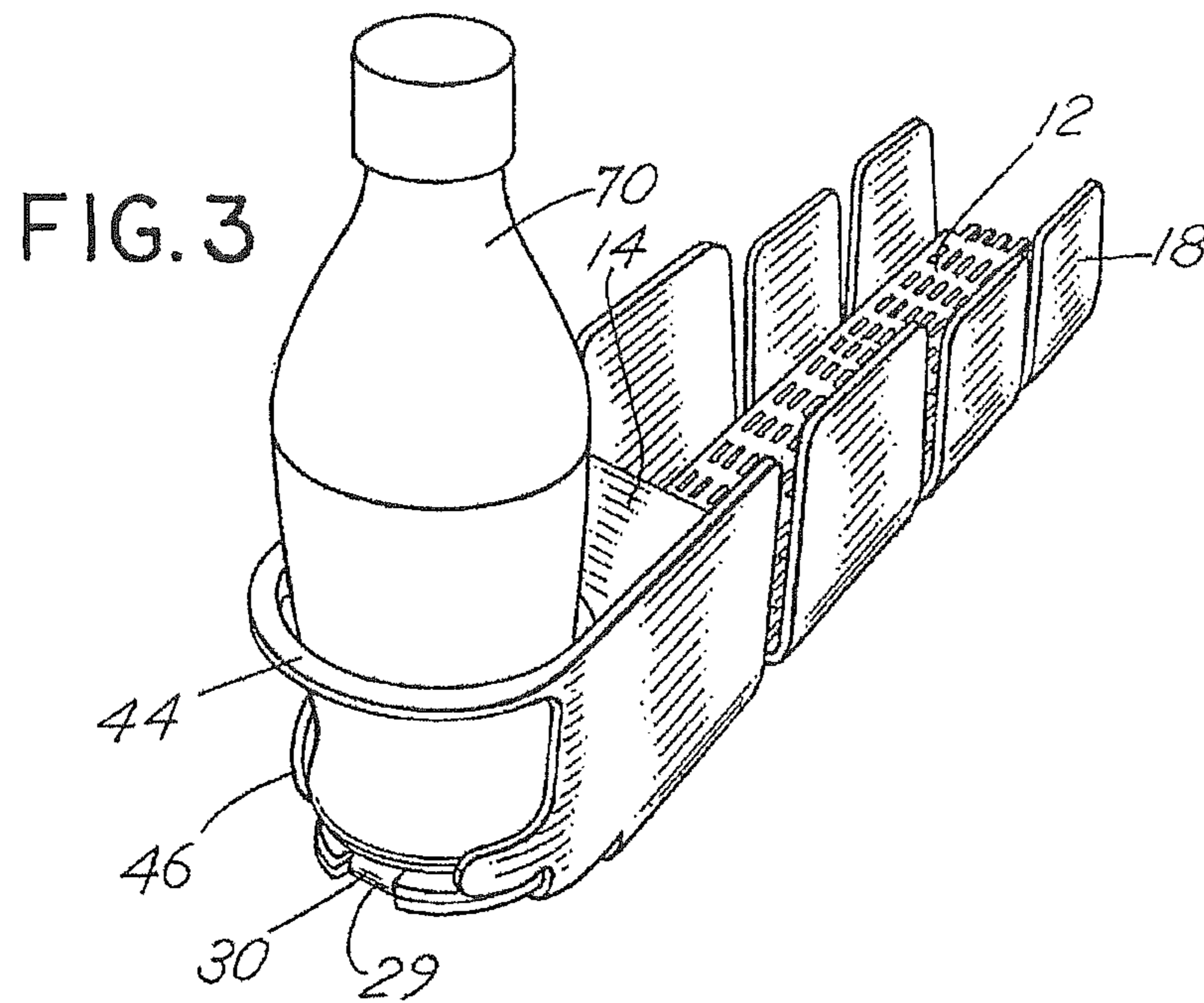


FIG. 2





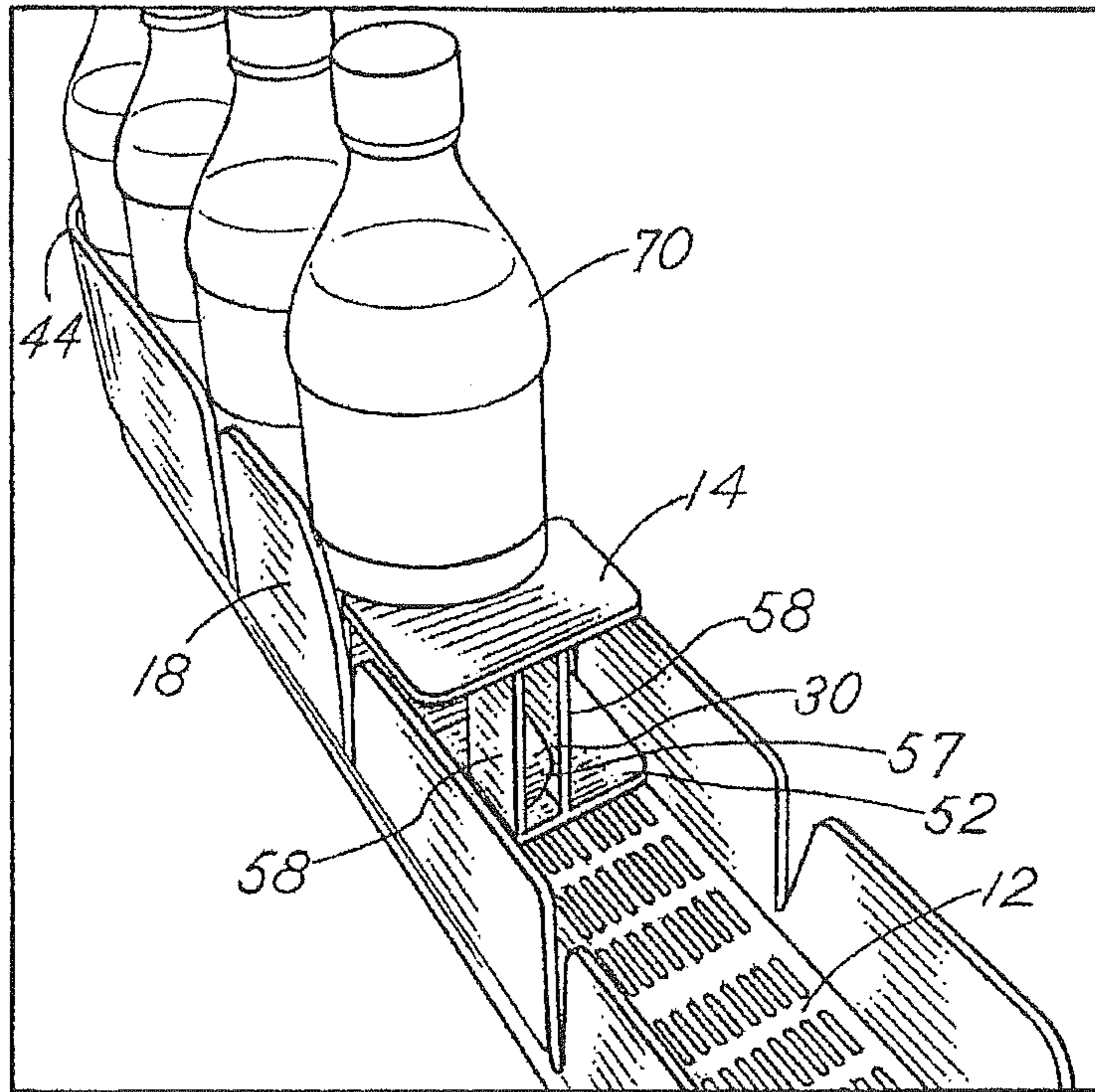


FIG. 5

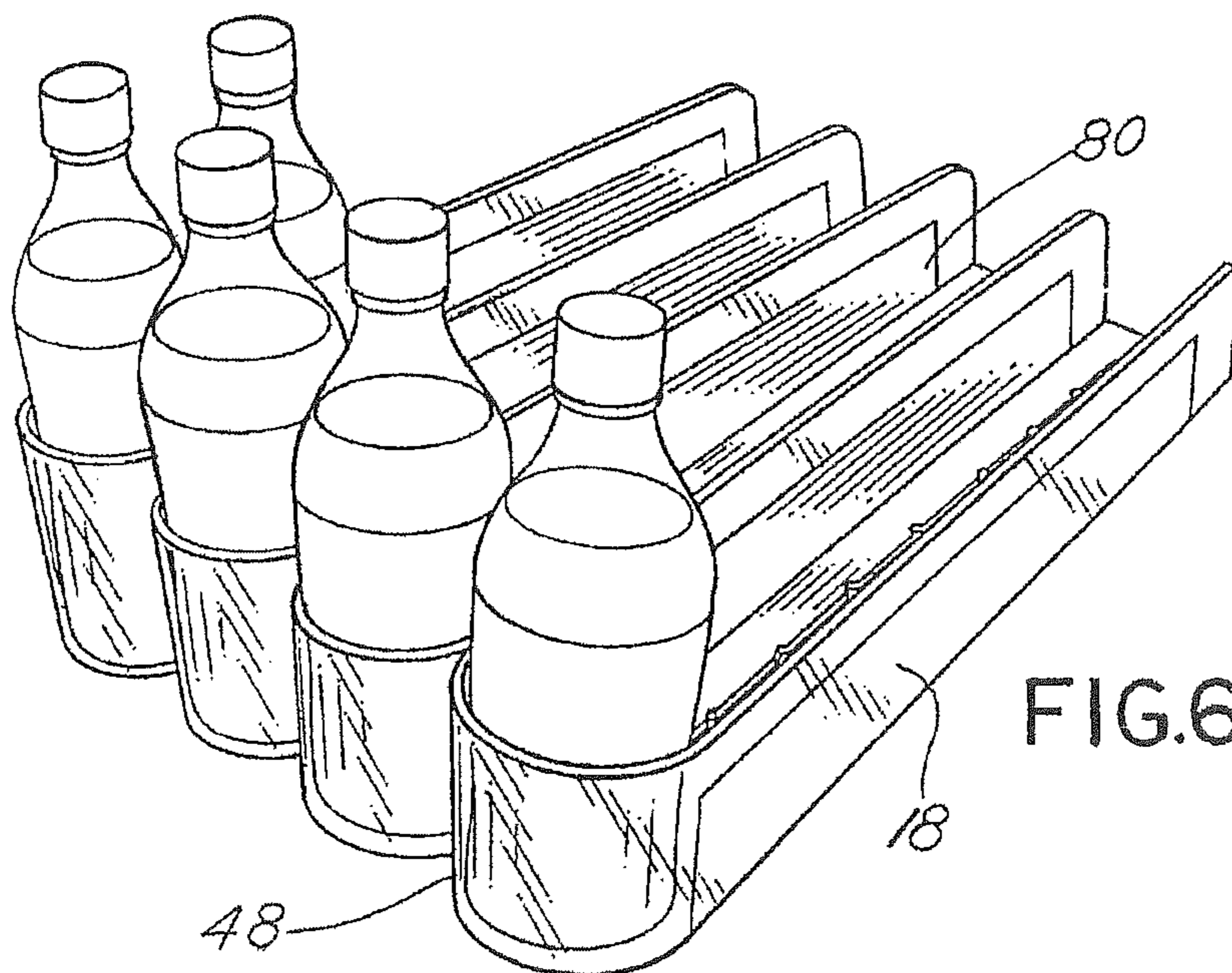


FIG. 6

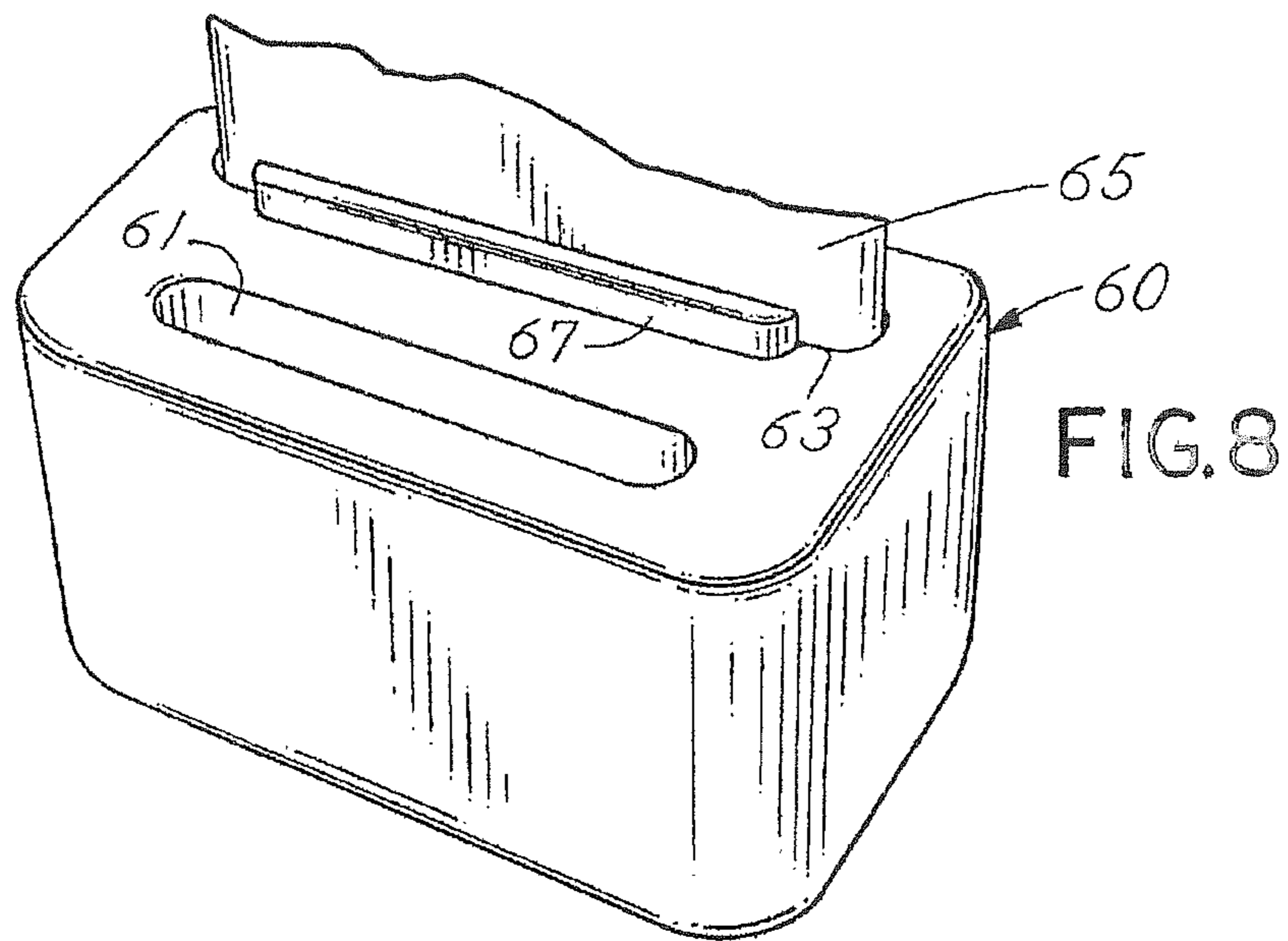
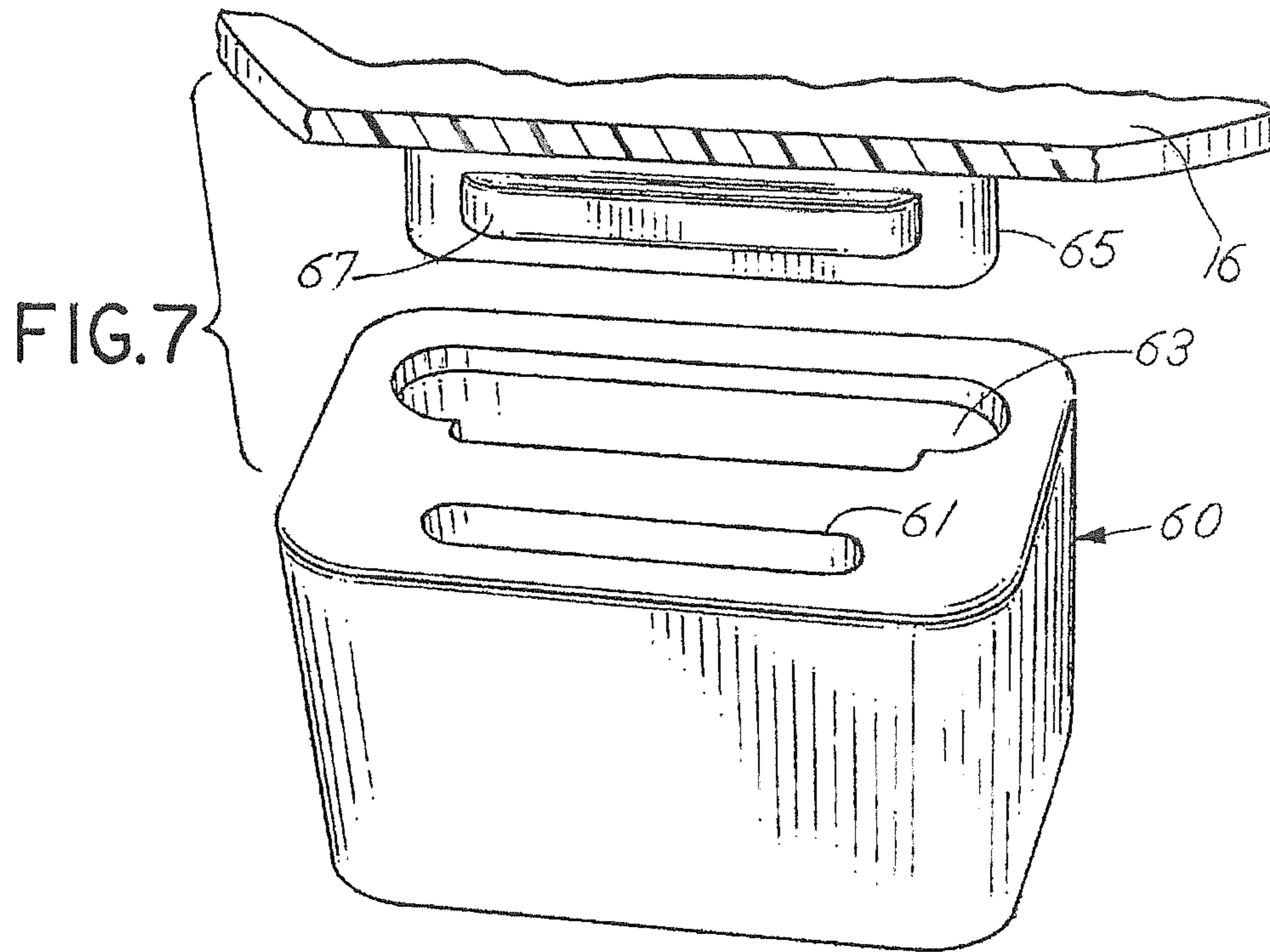


FIG.9

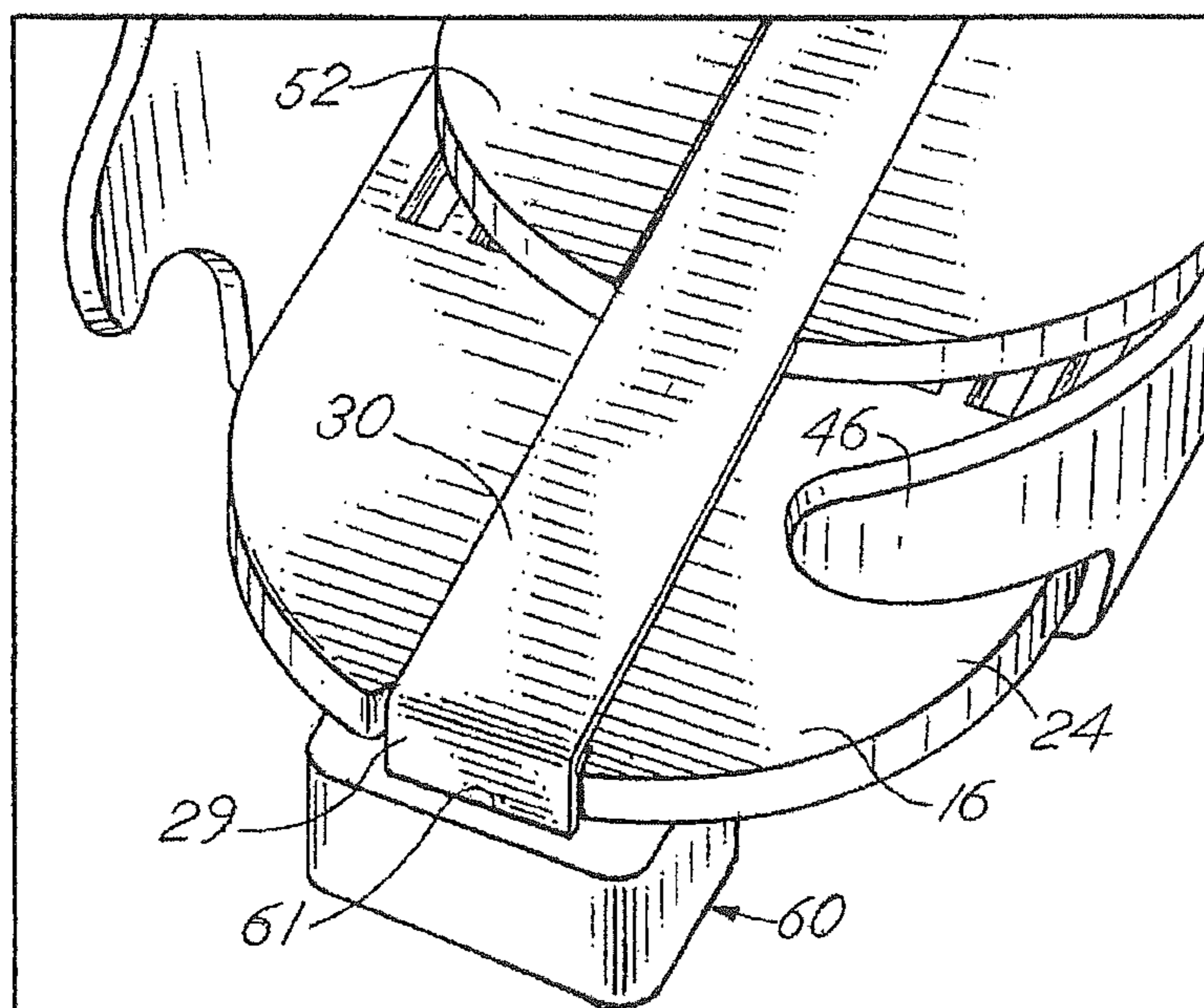
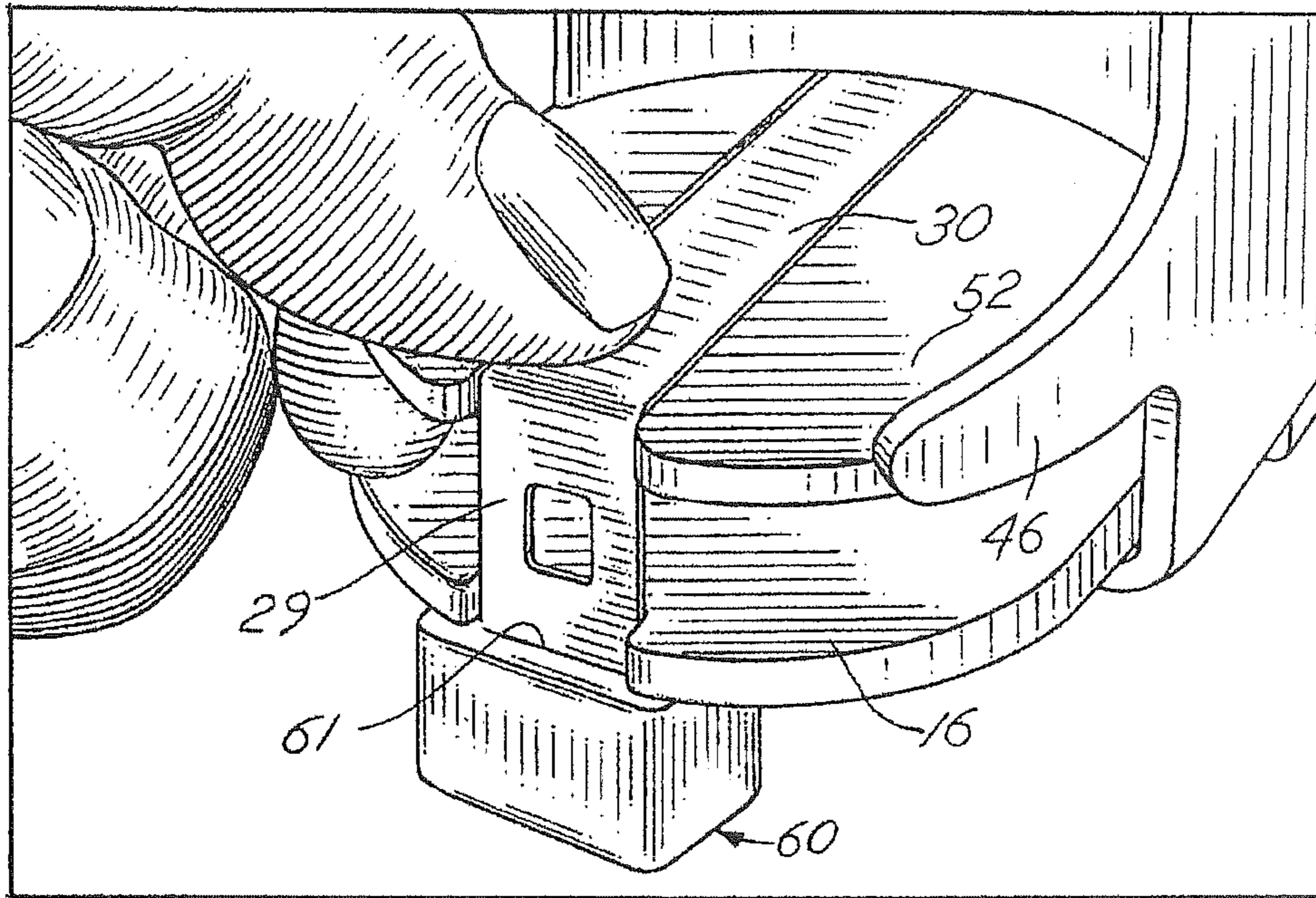


FIG.10

FIG.11

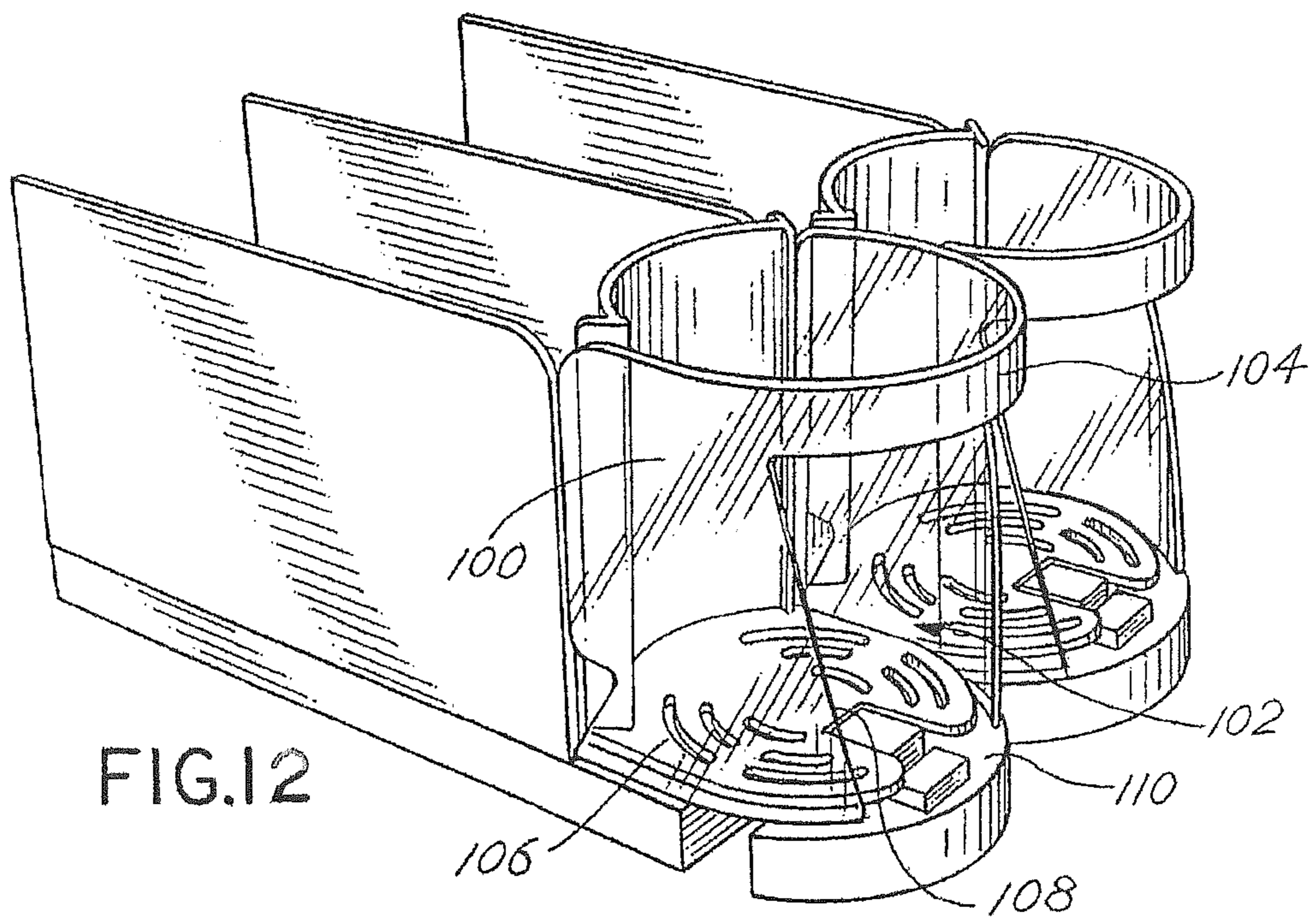
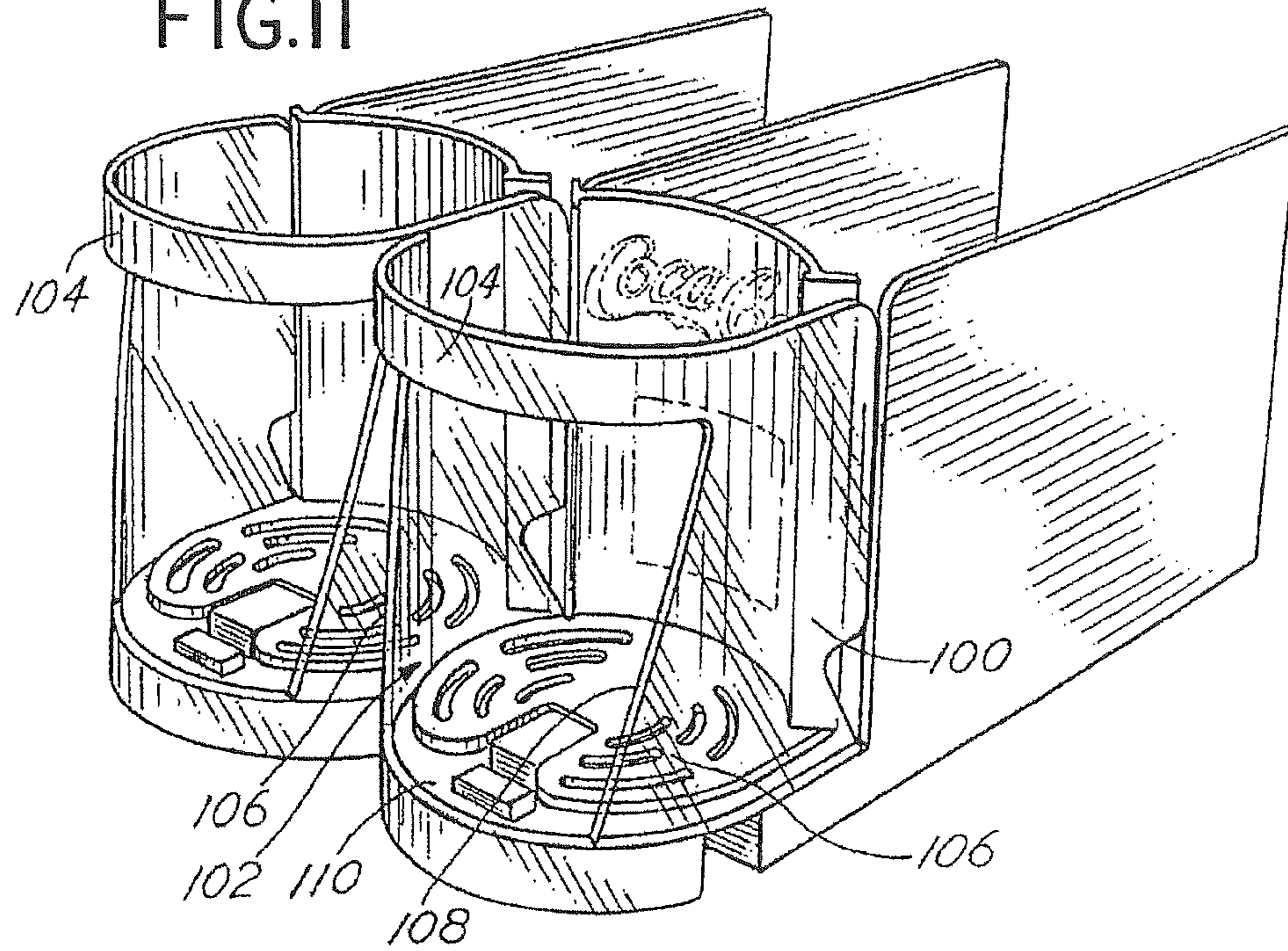


FIG.13

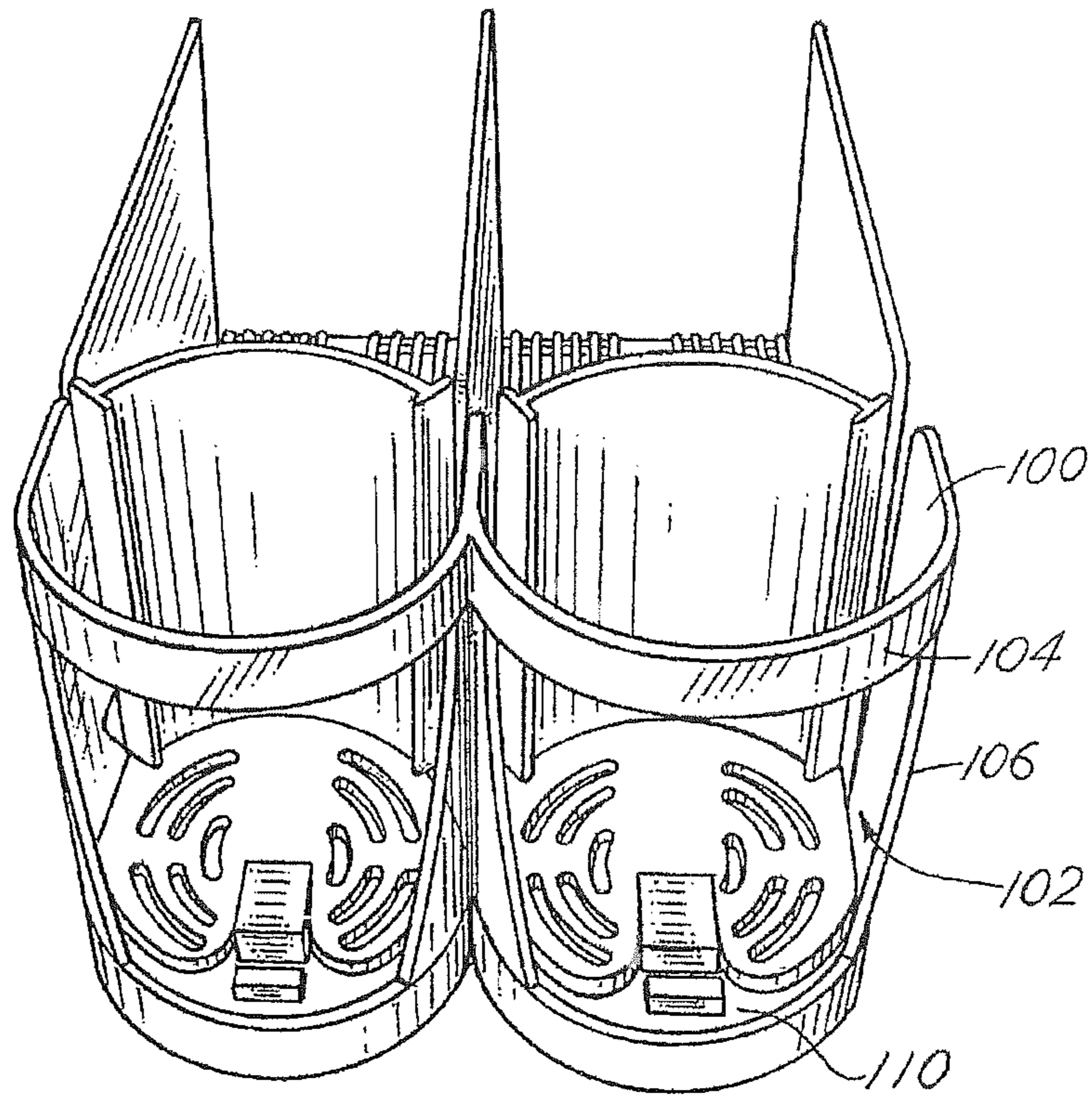


FIG.14

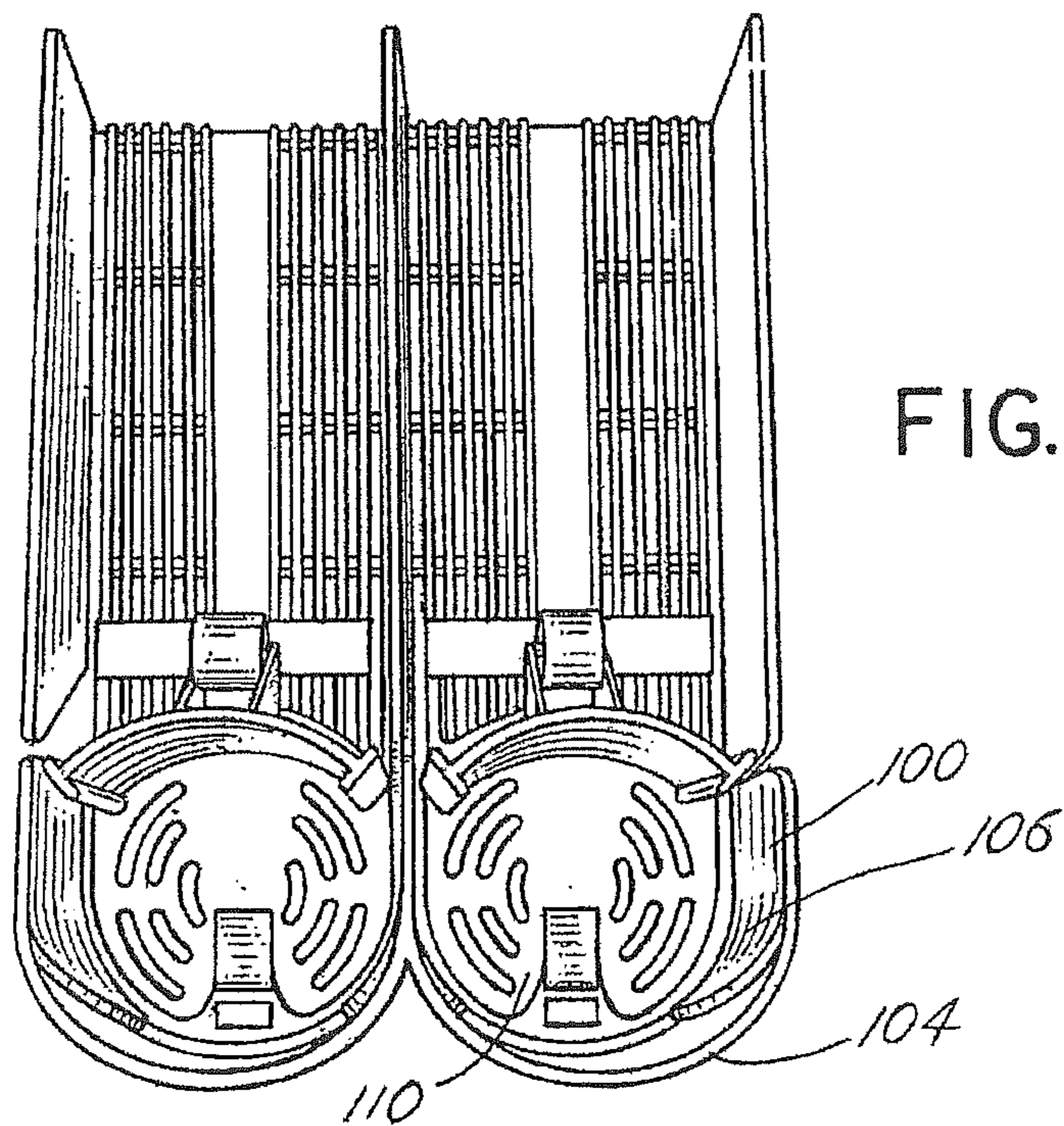


FIG.15

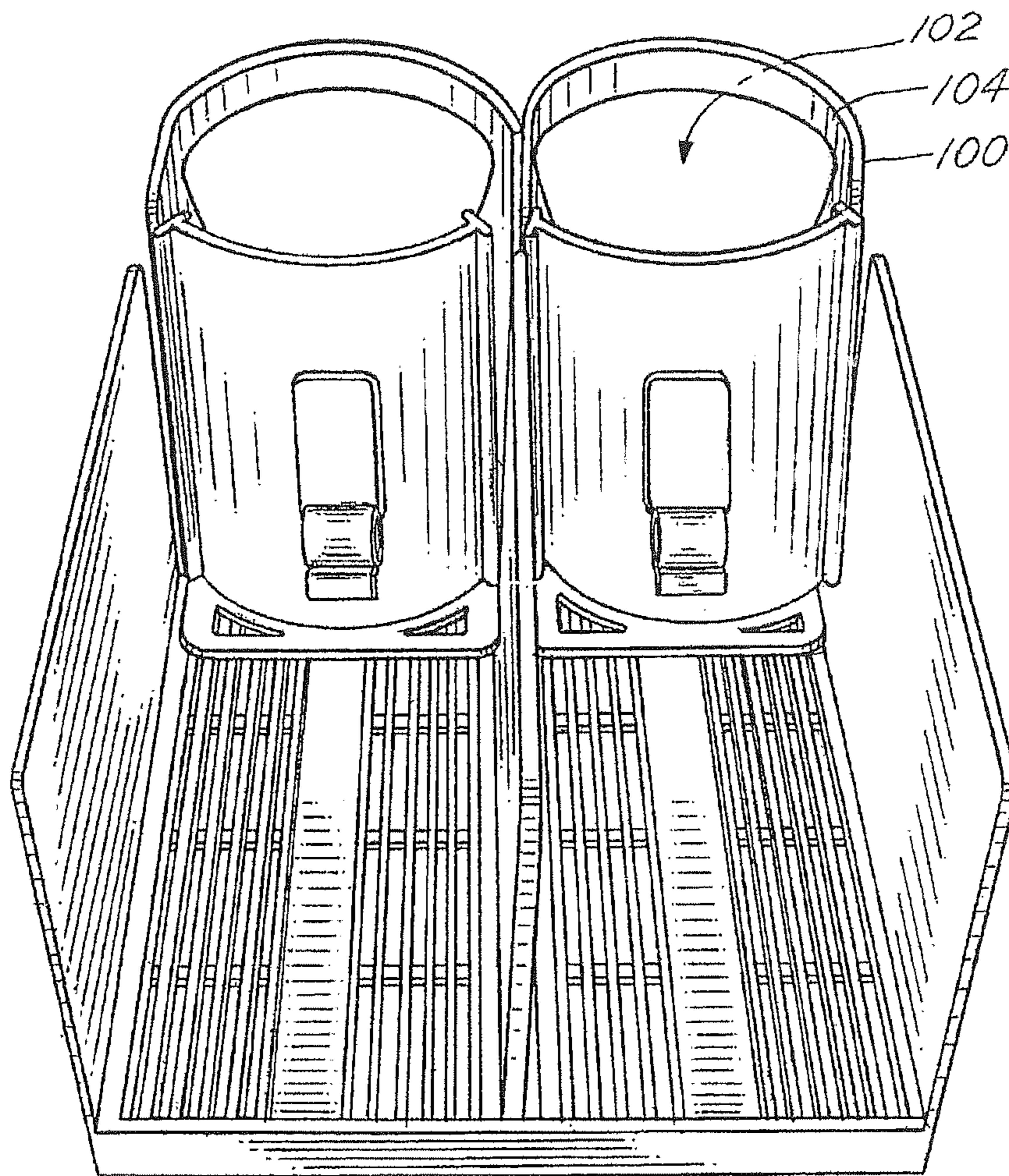


FIG.16

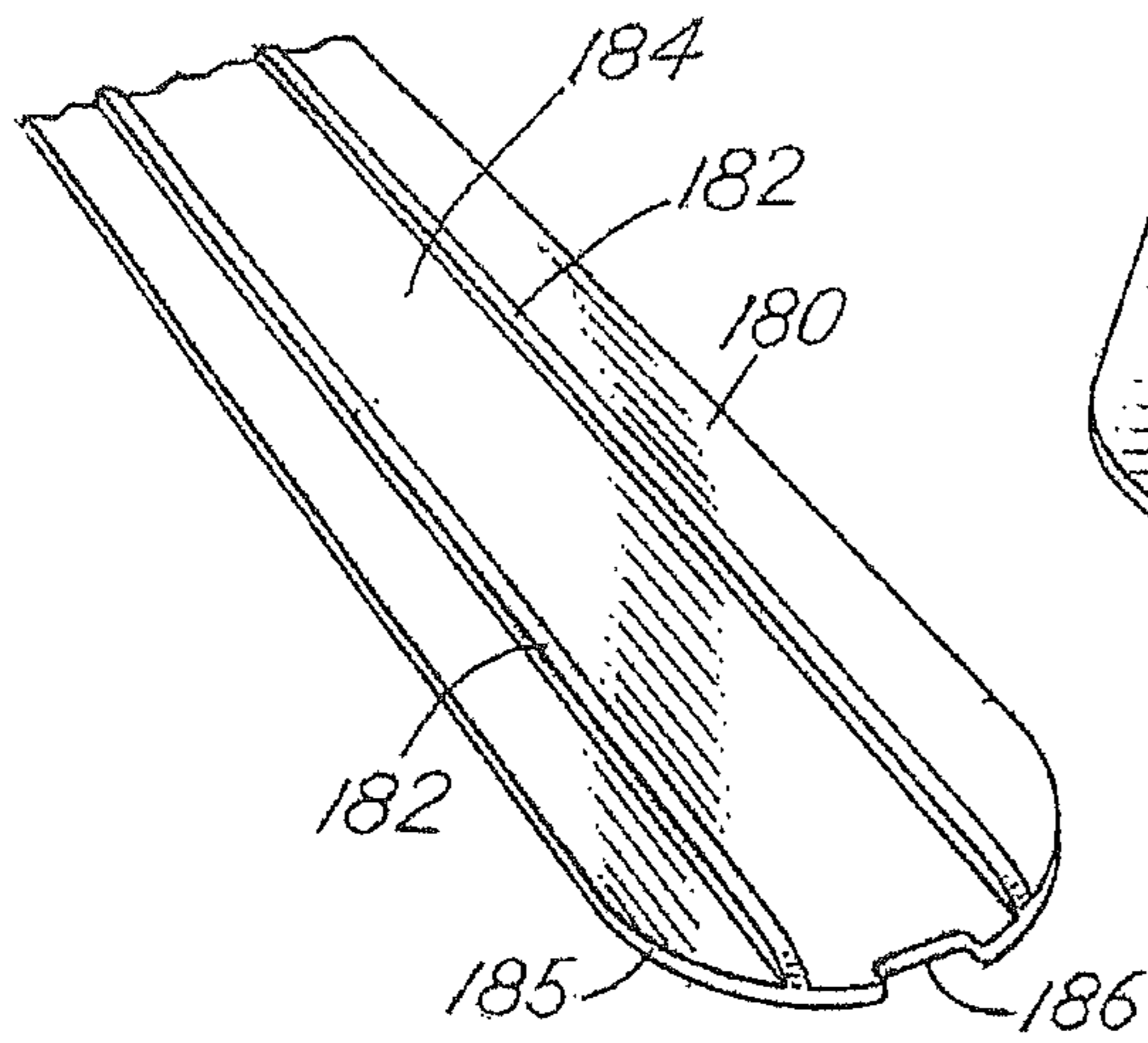


FIG.17

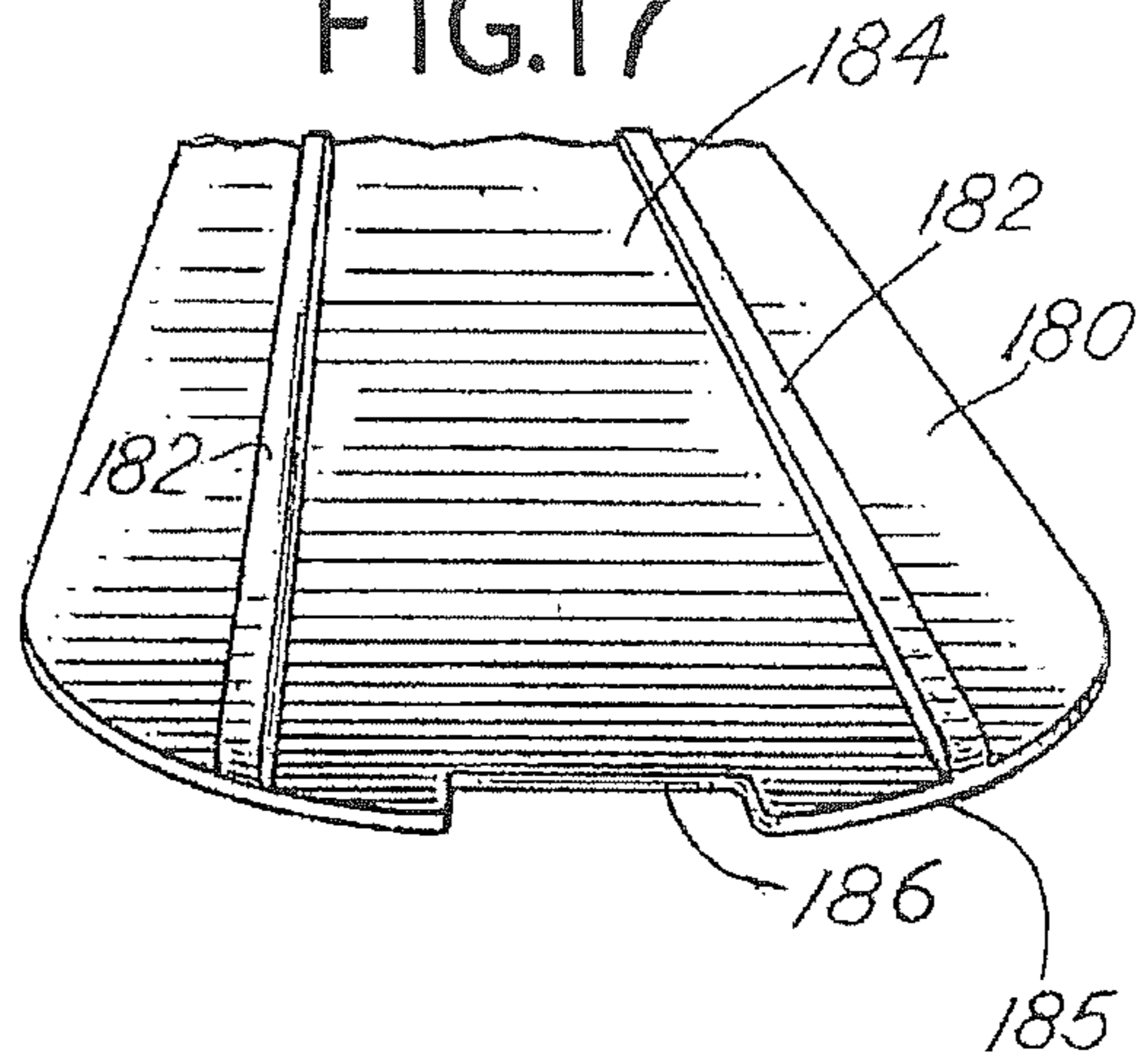


FIG.18

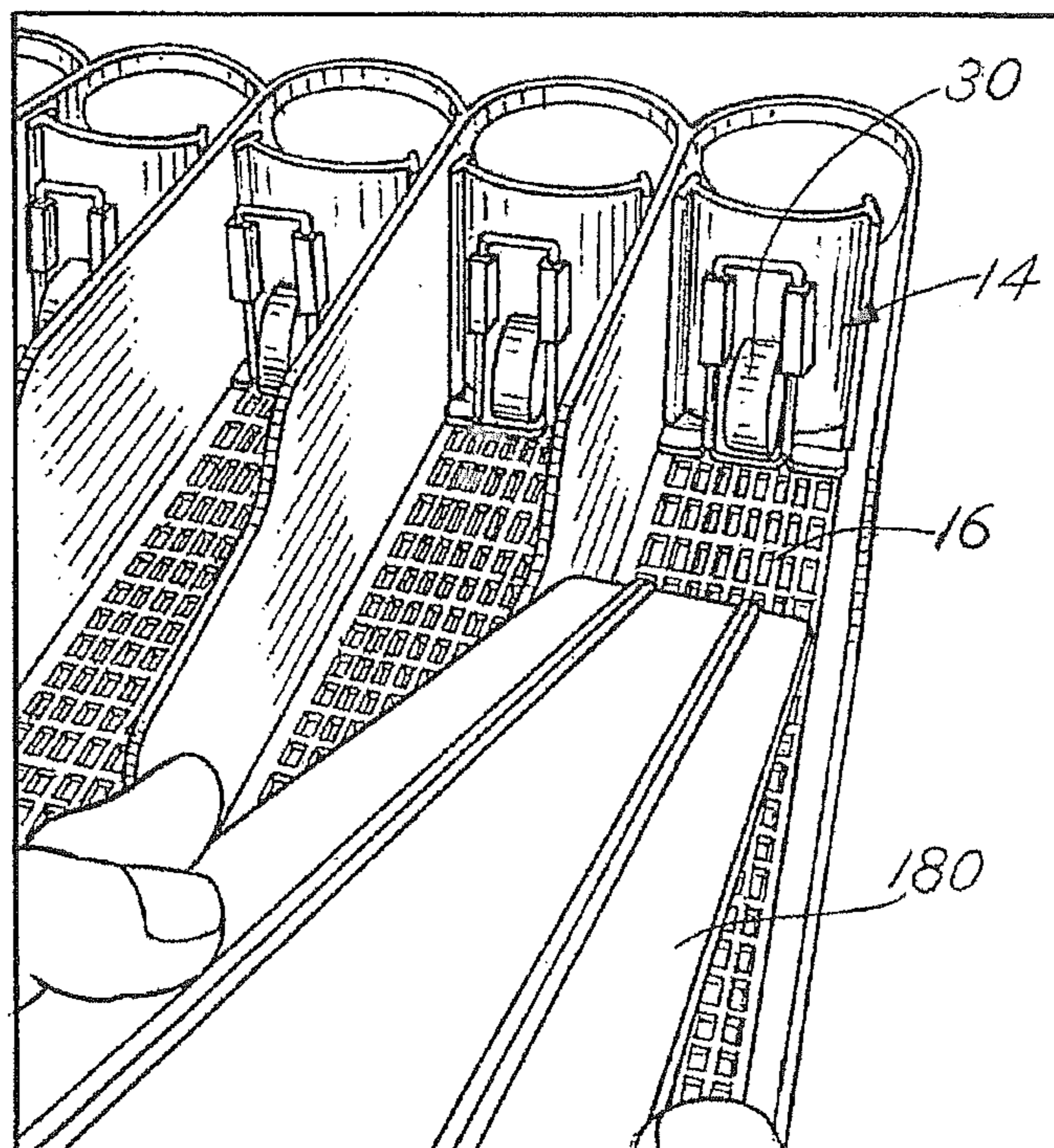


FIG.19

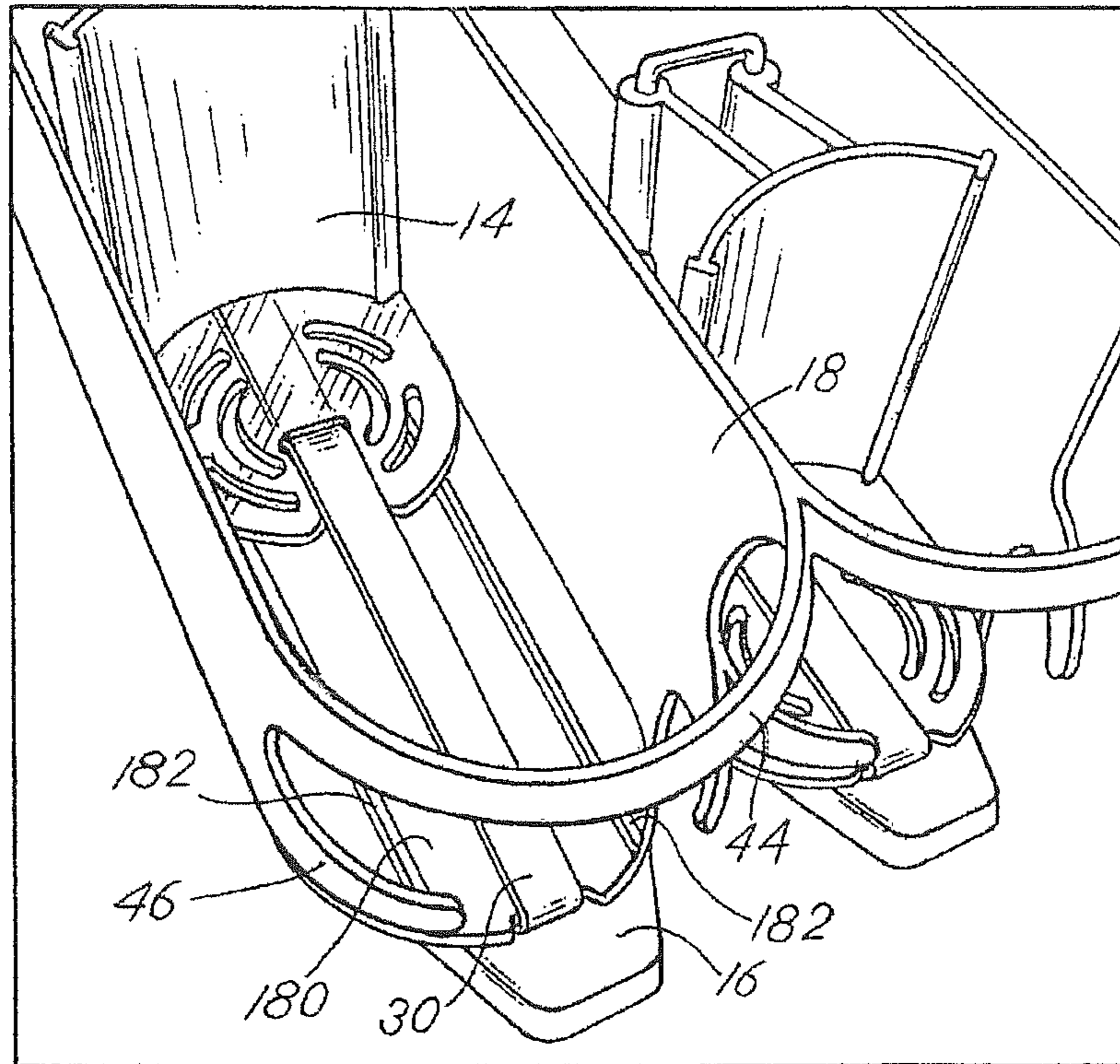


FIG. 20

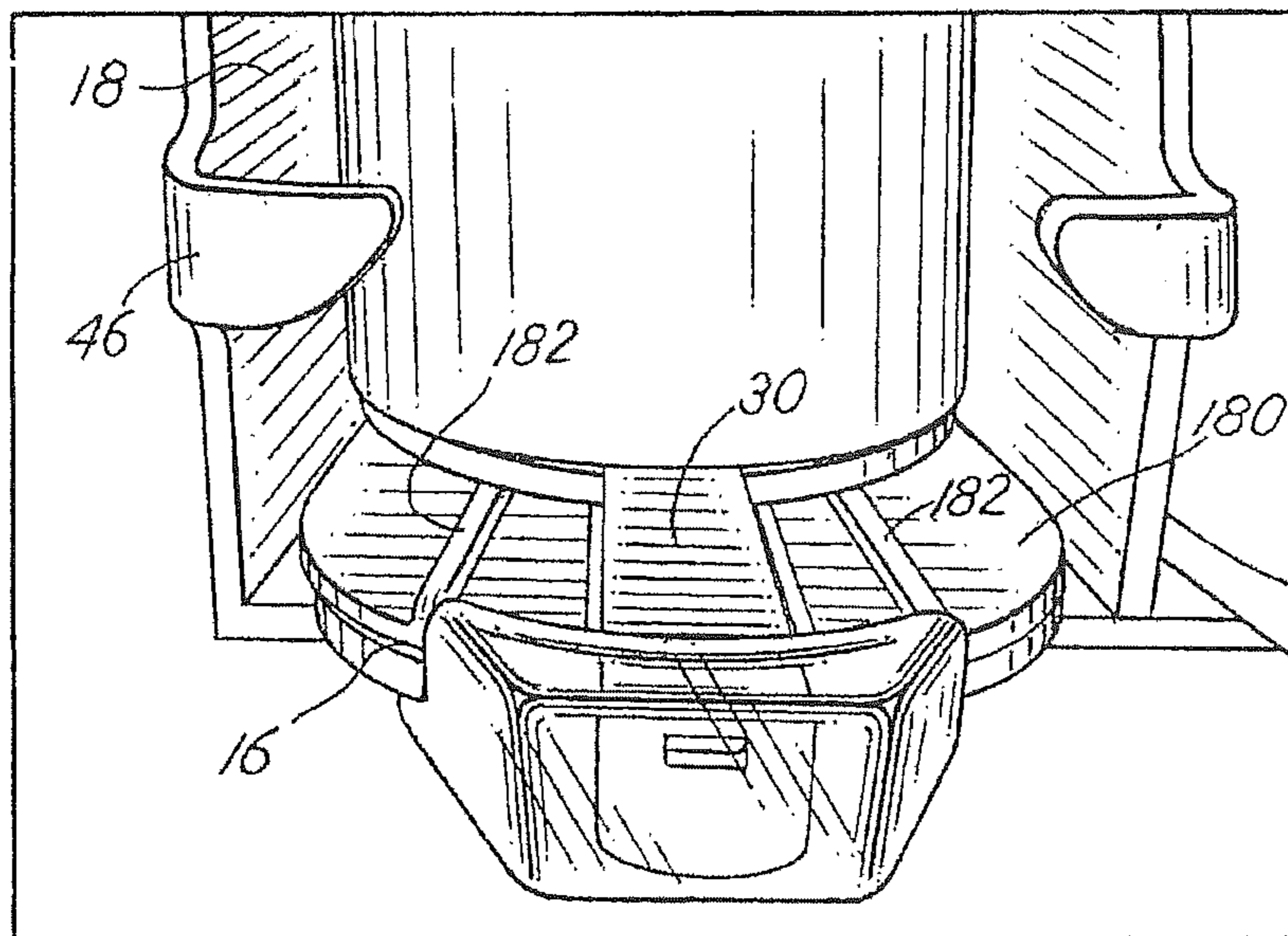


FIG. 21

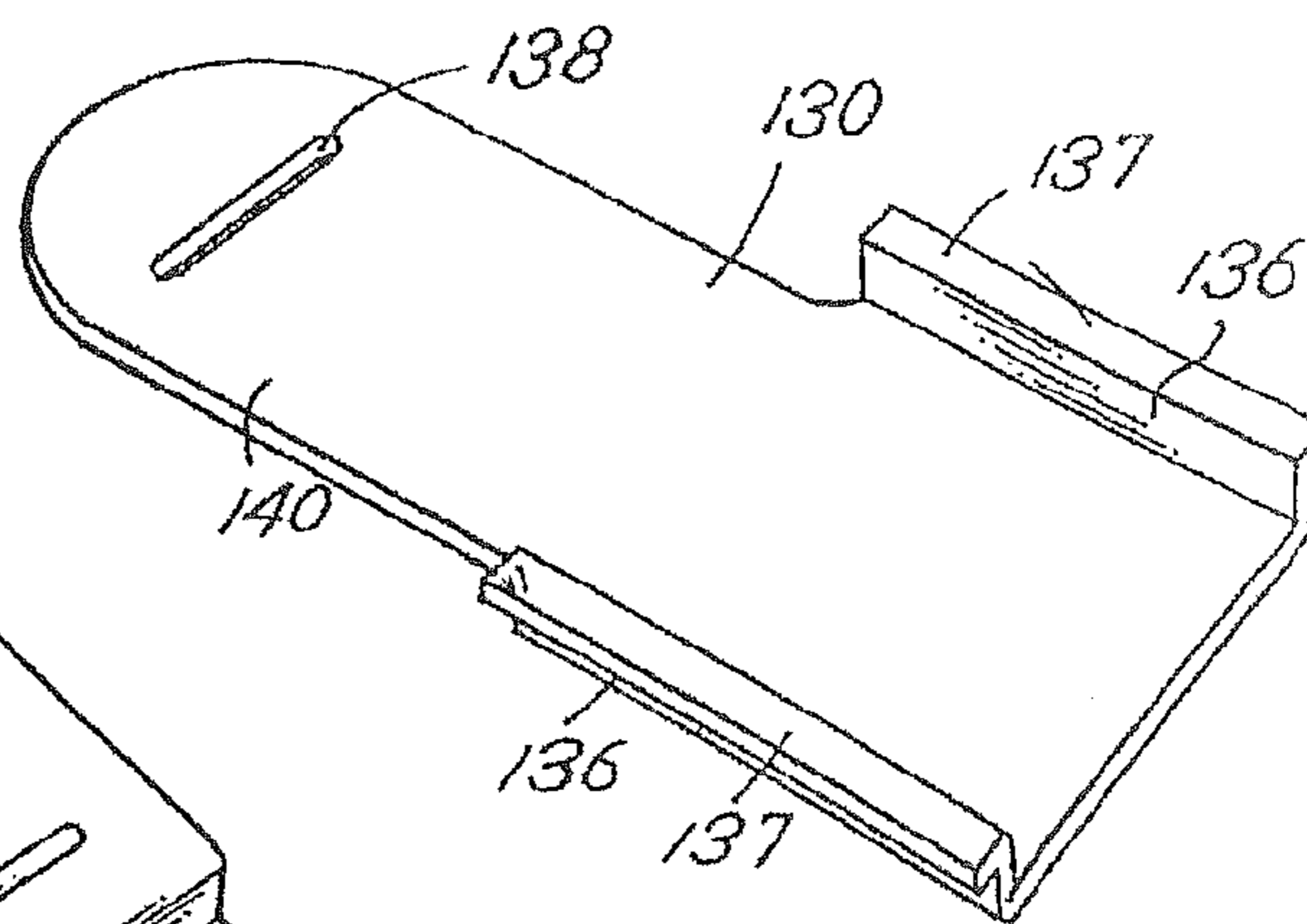
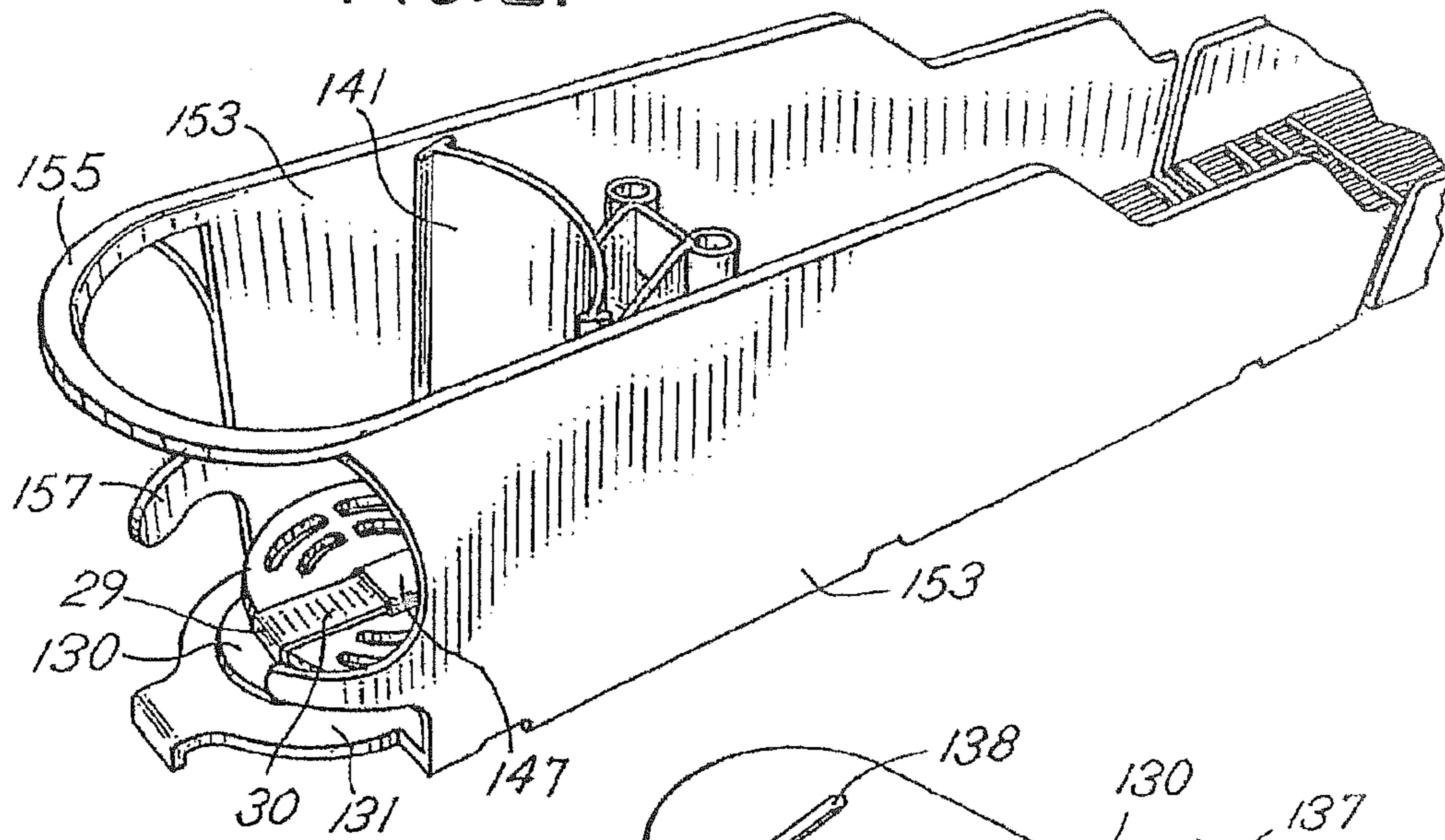


FIG. 22

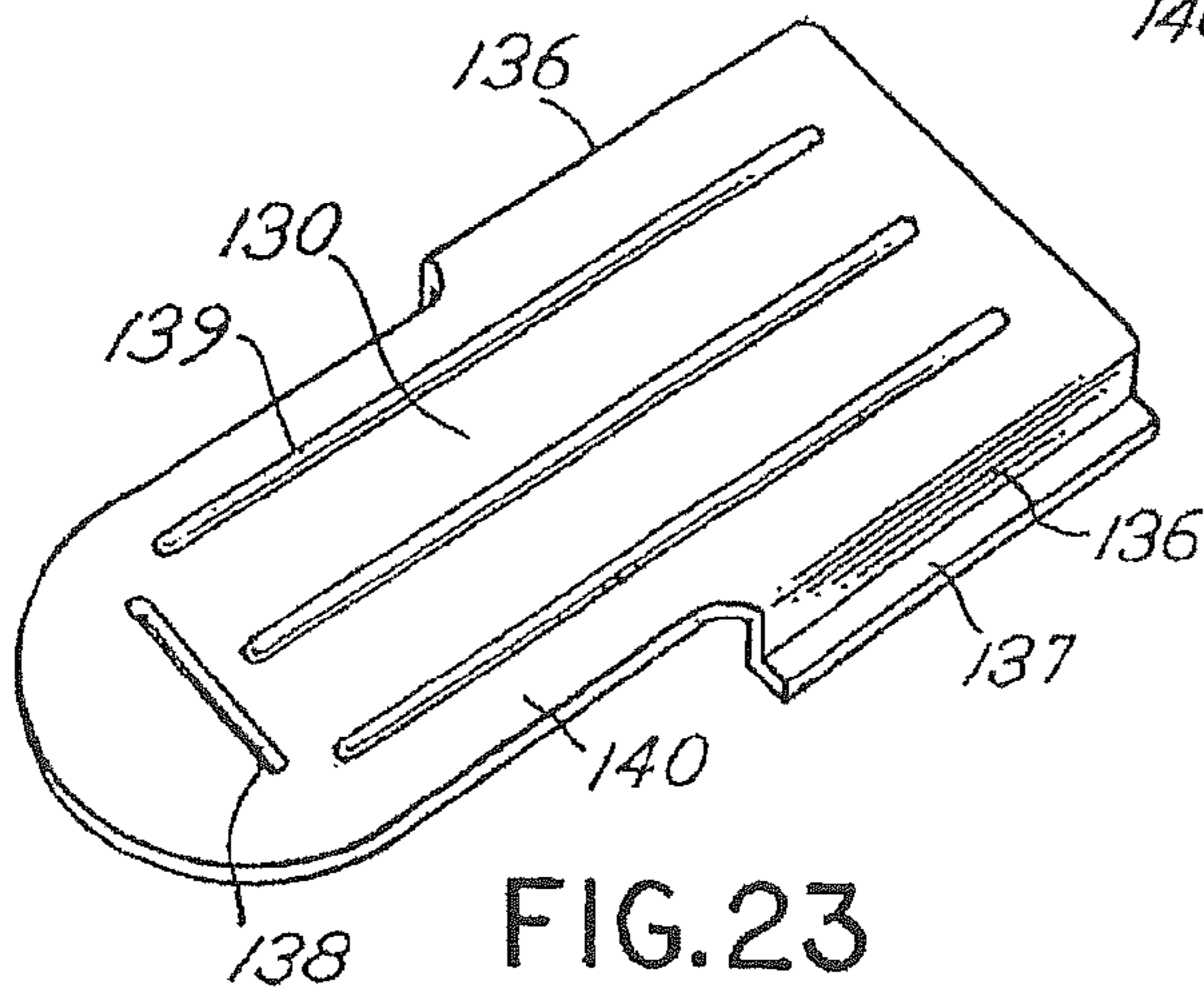


FIG. 23

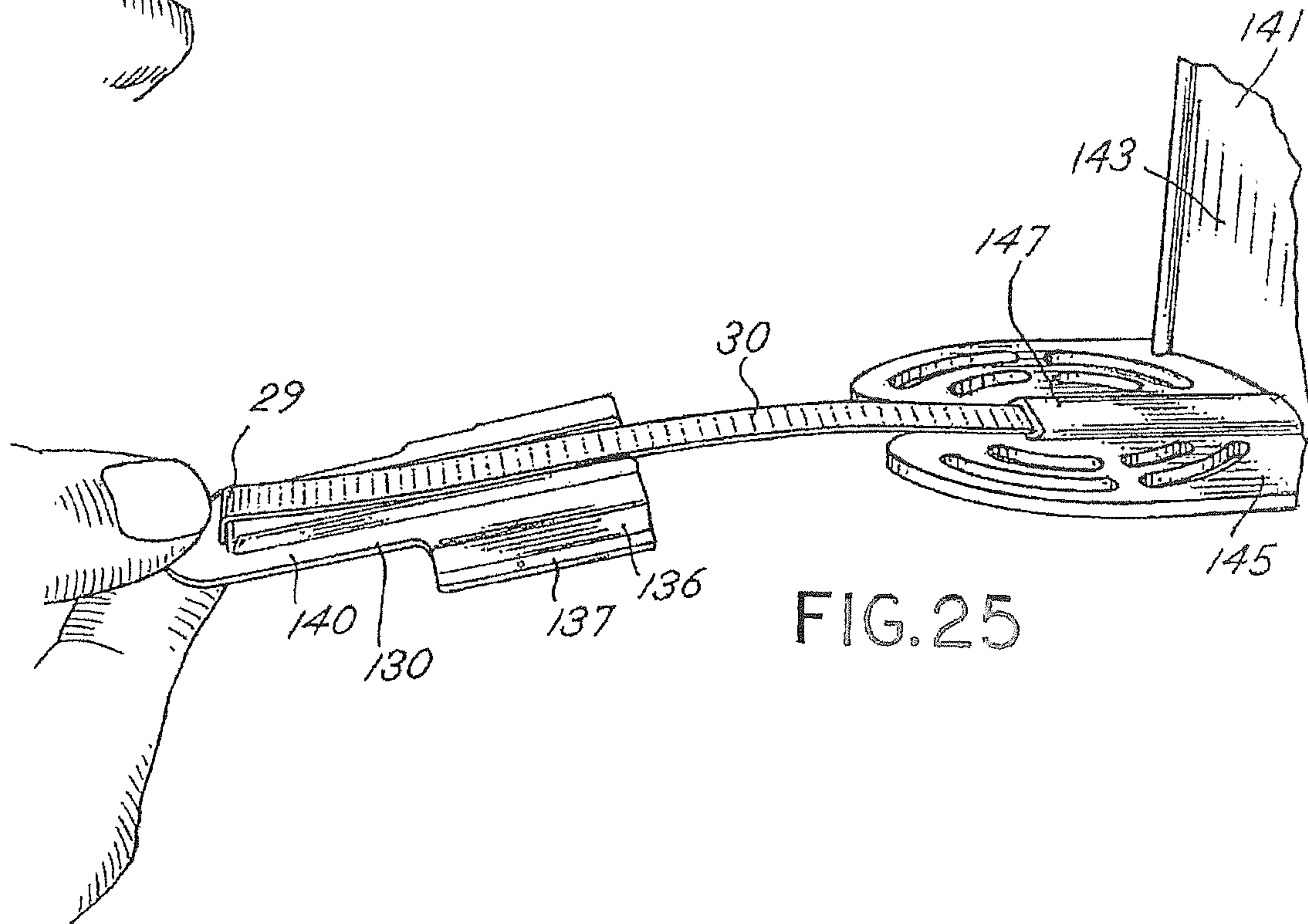
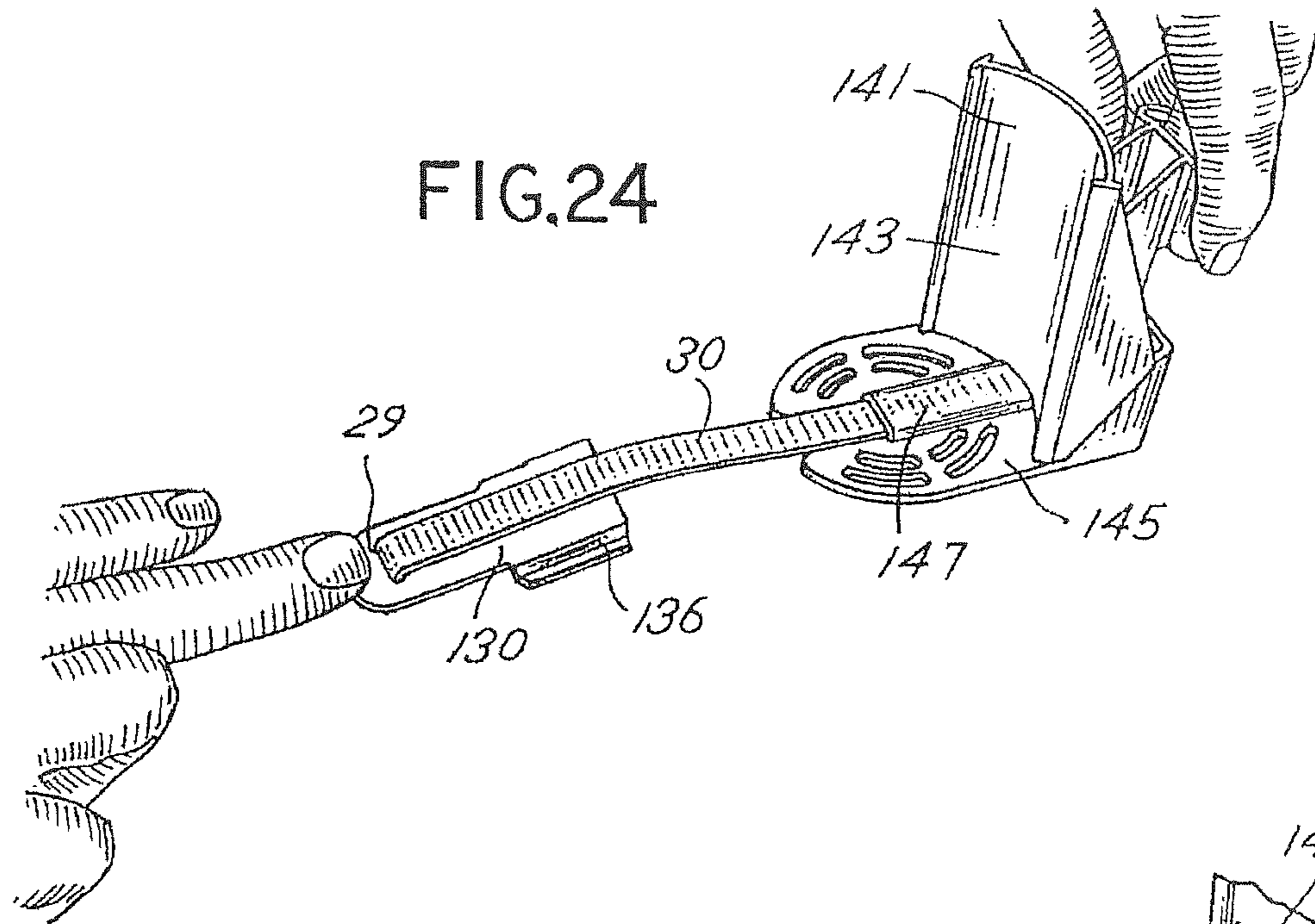


FIG.26

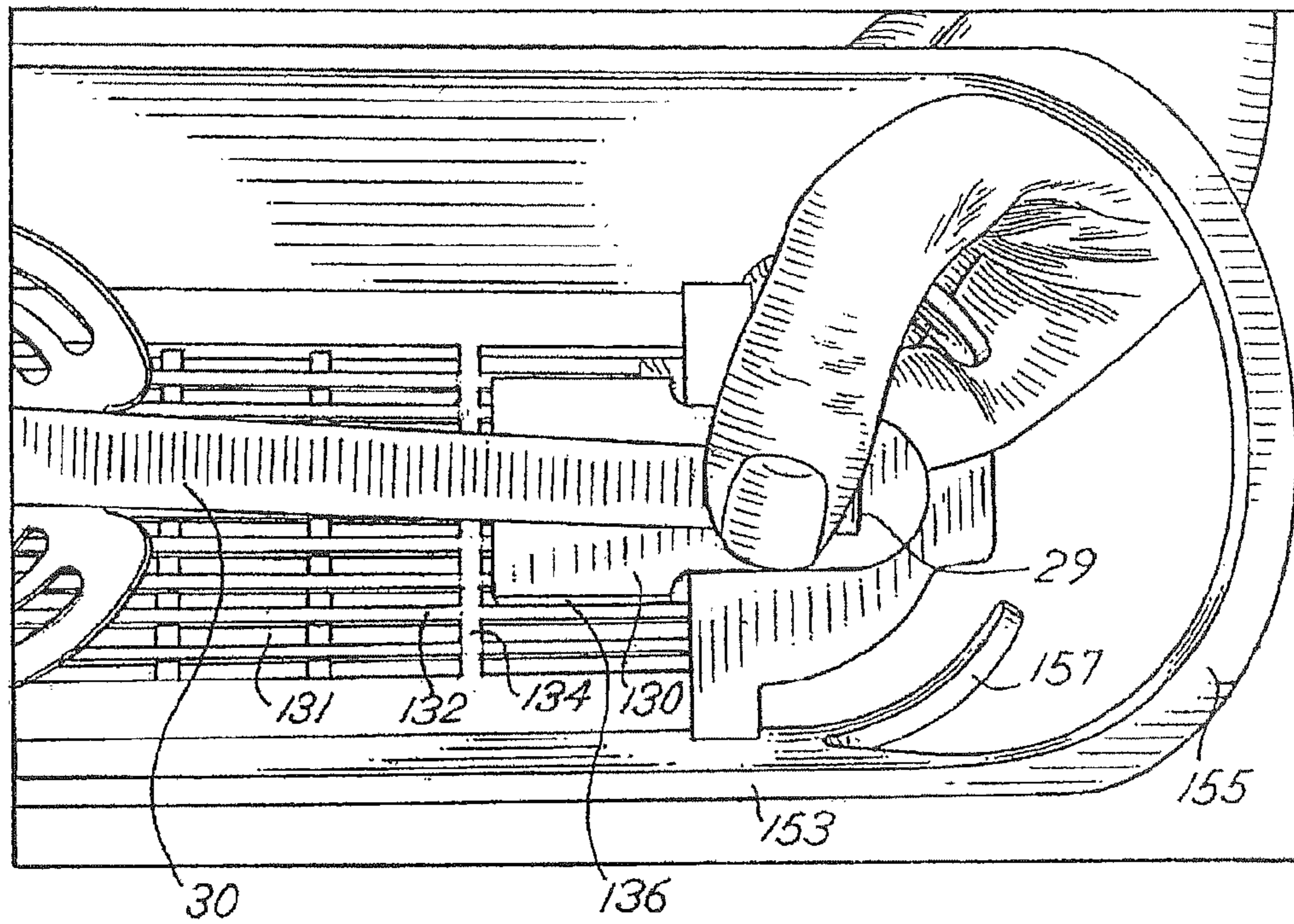
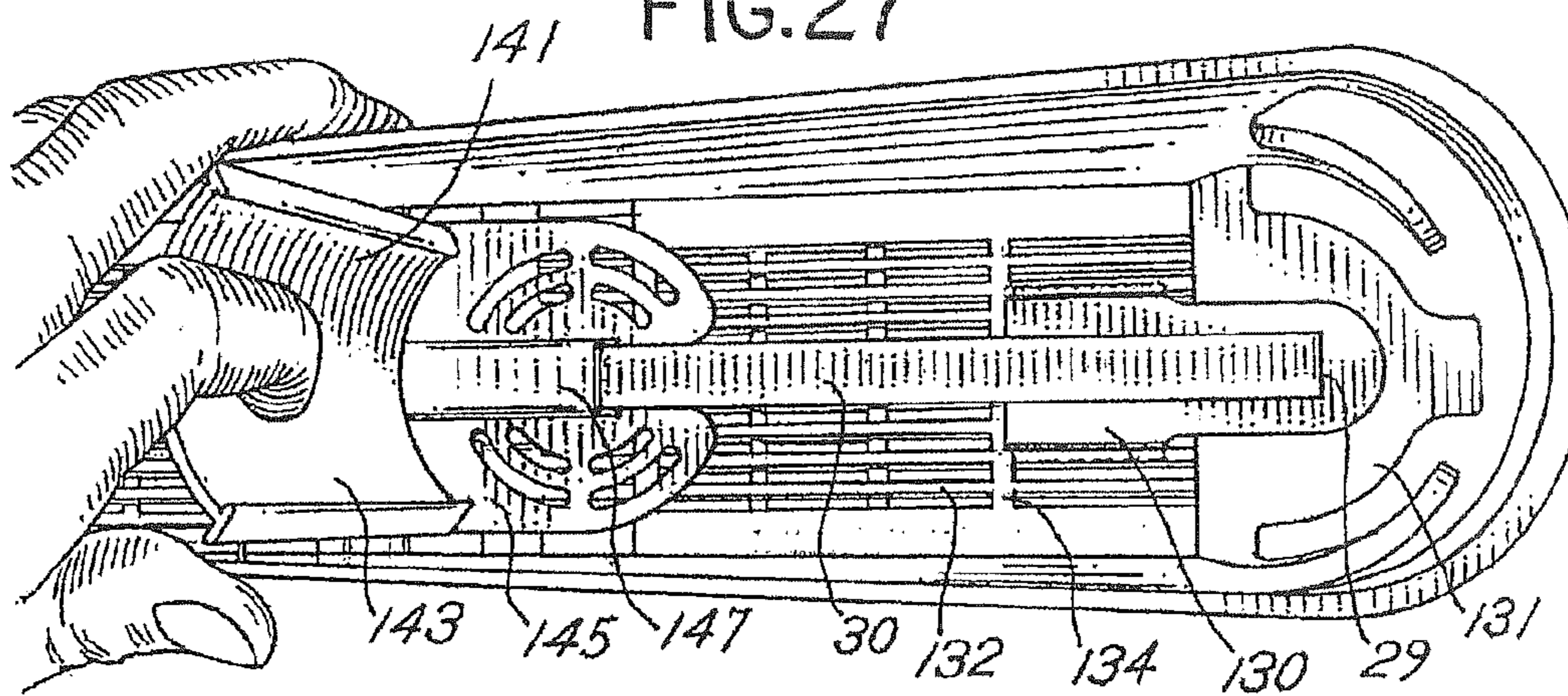


FIG.27



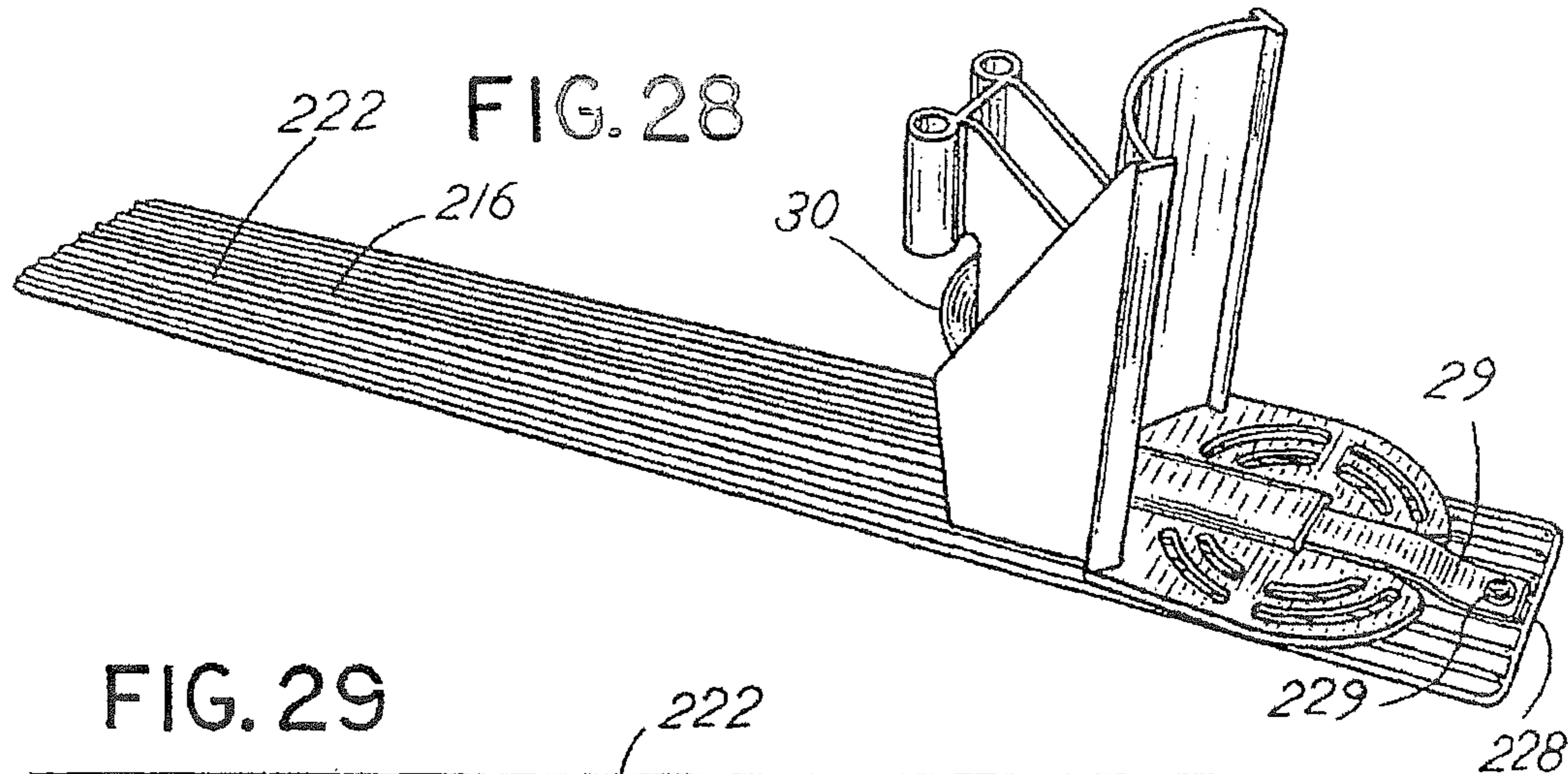


FIG. 29

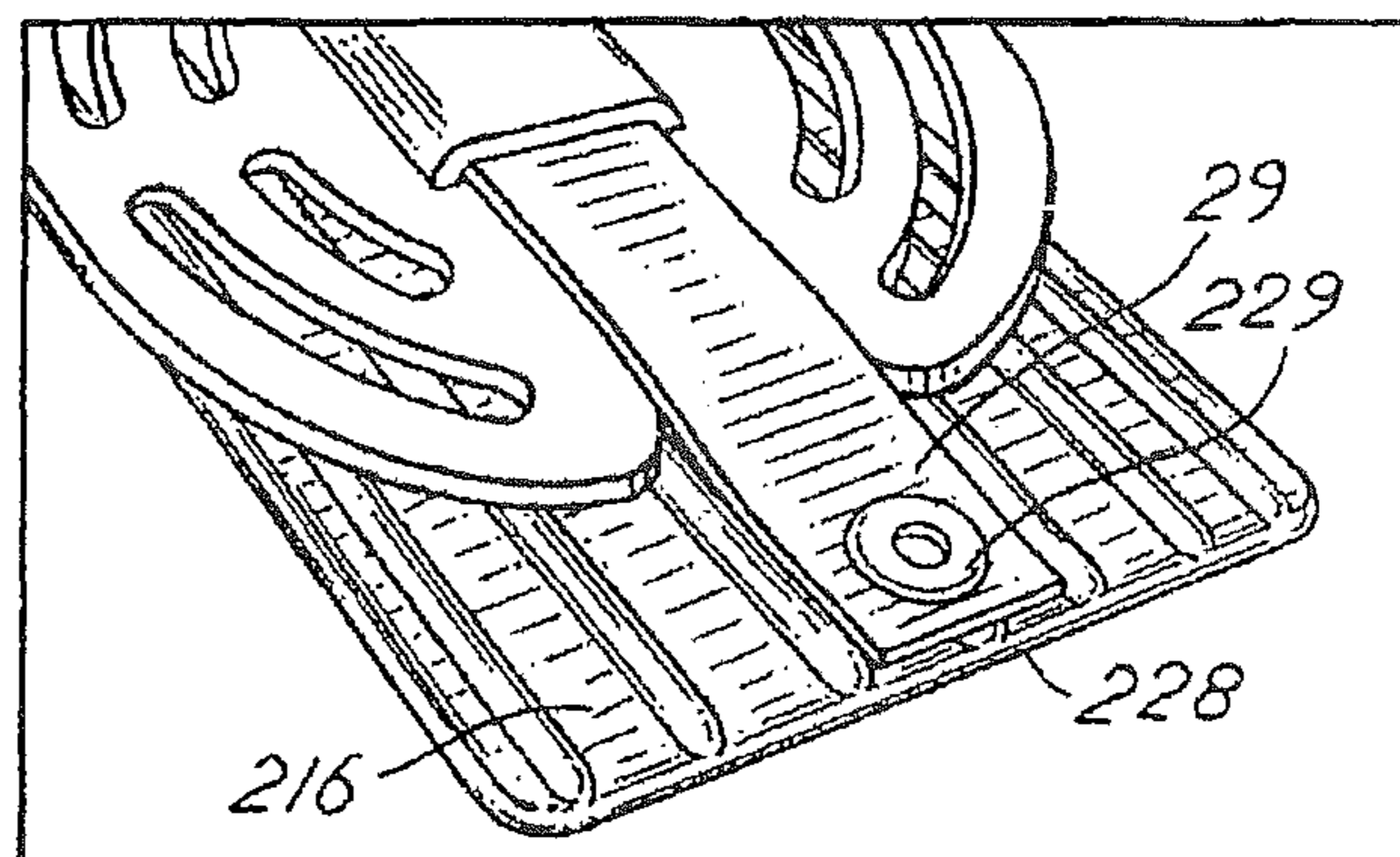
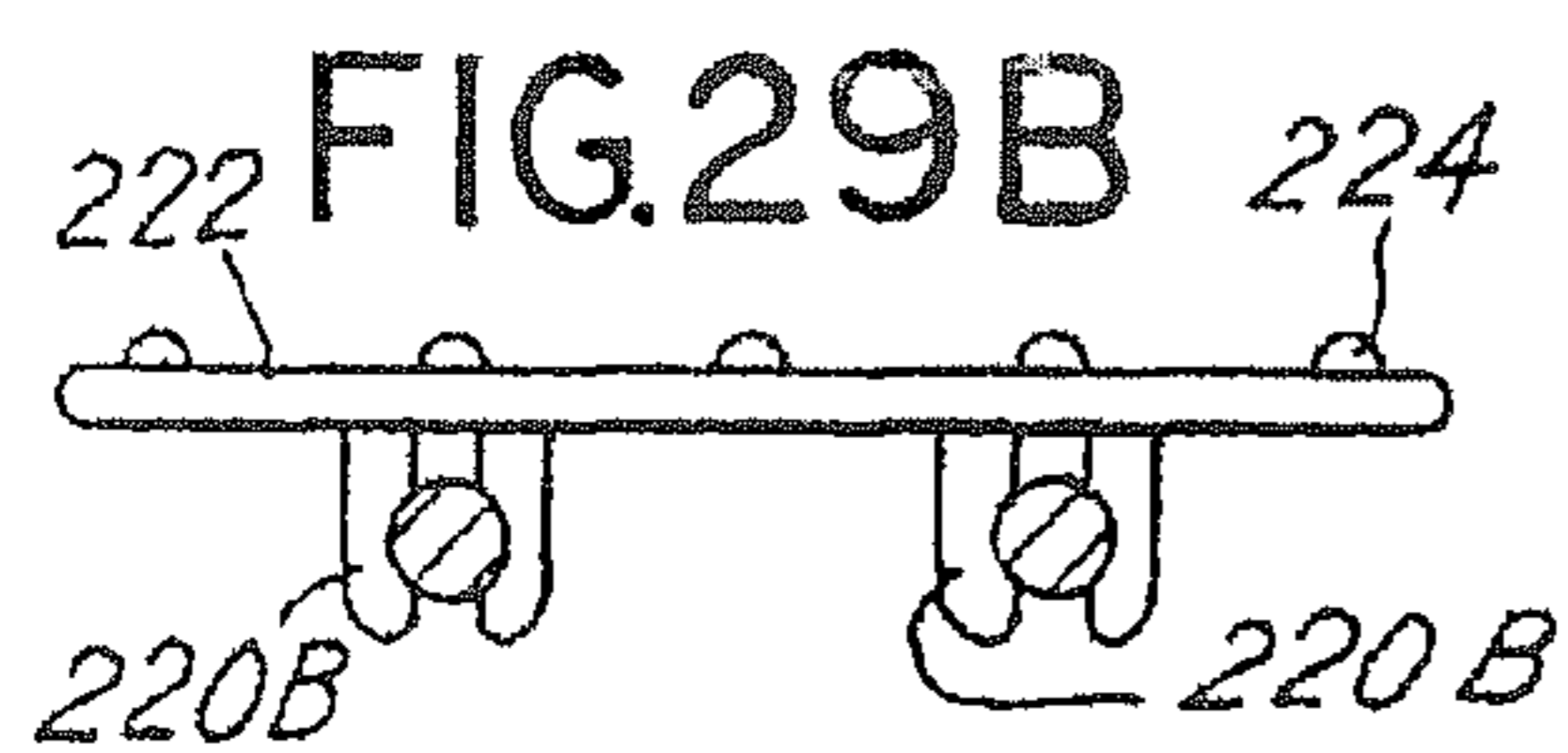
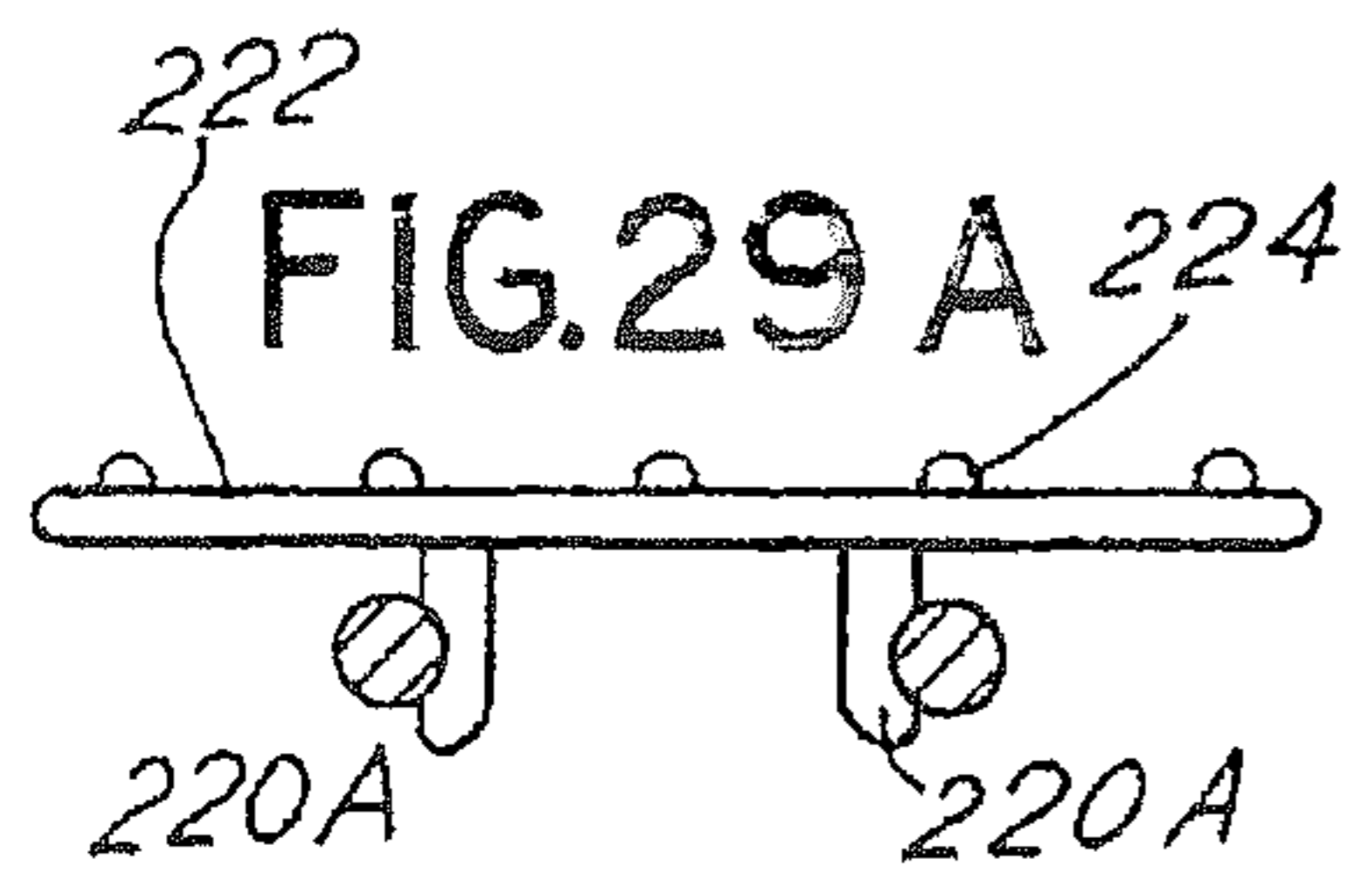
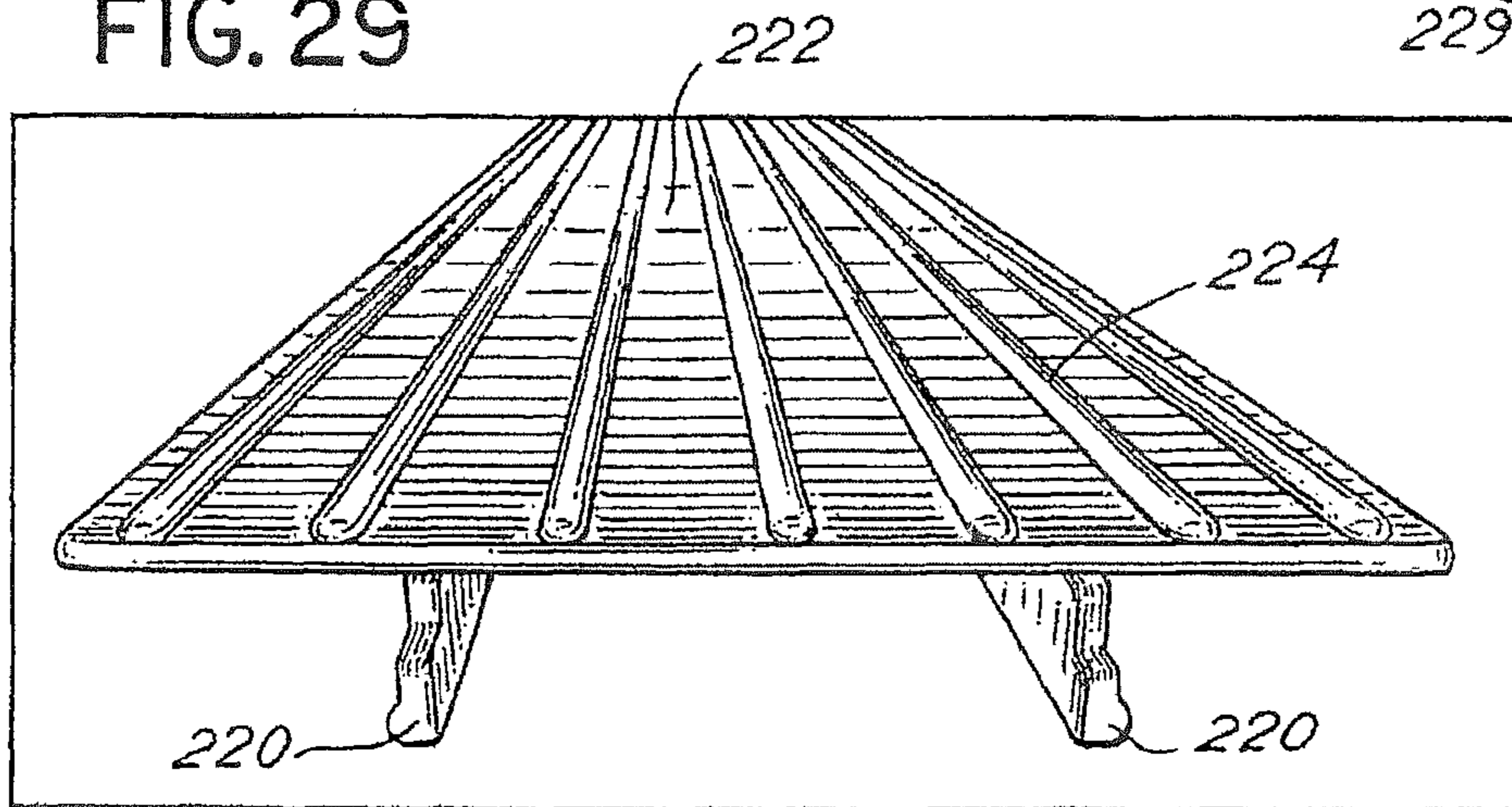


FIG. 30

FIG.31

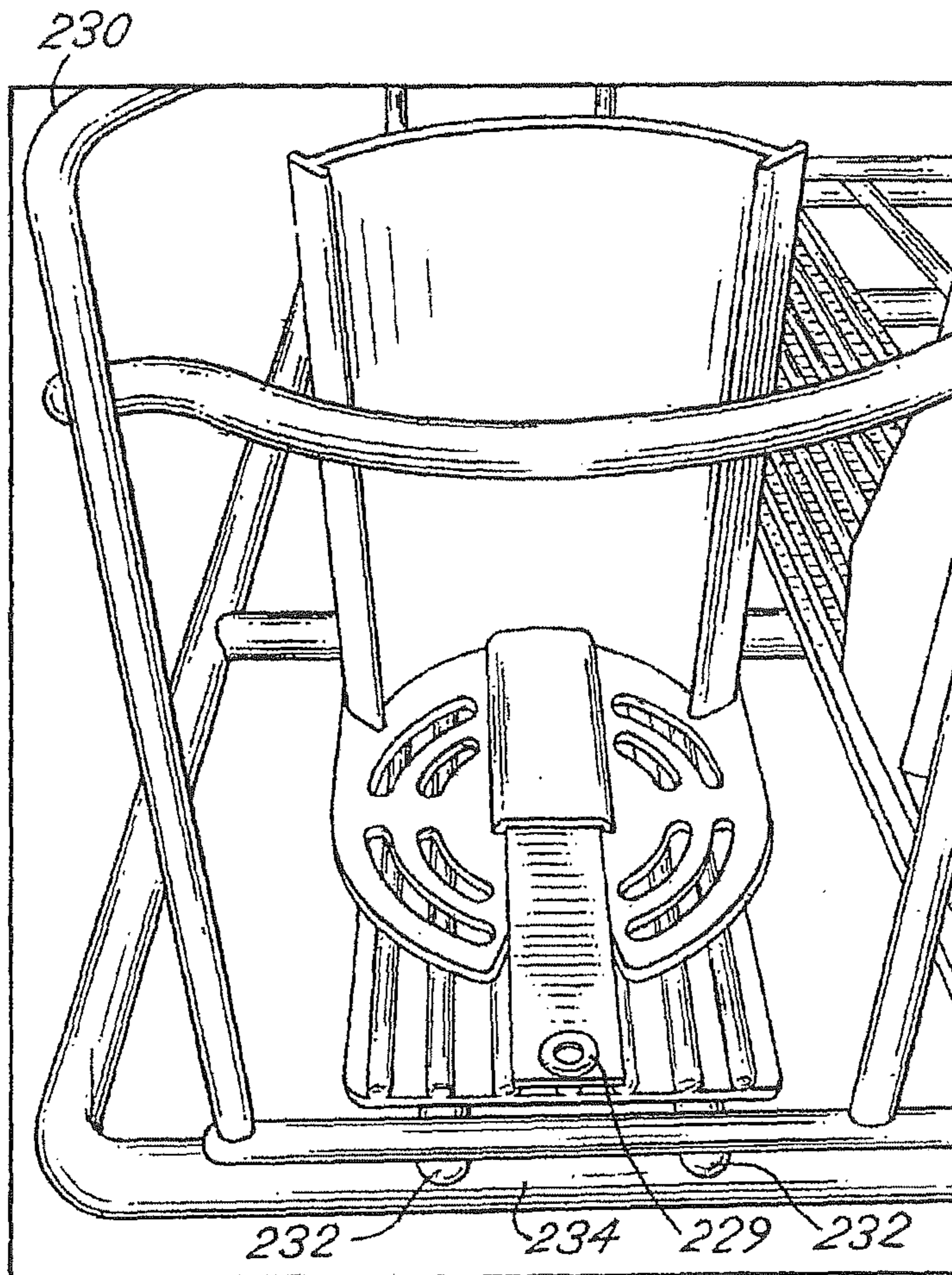
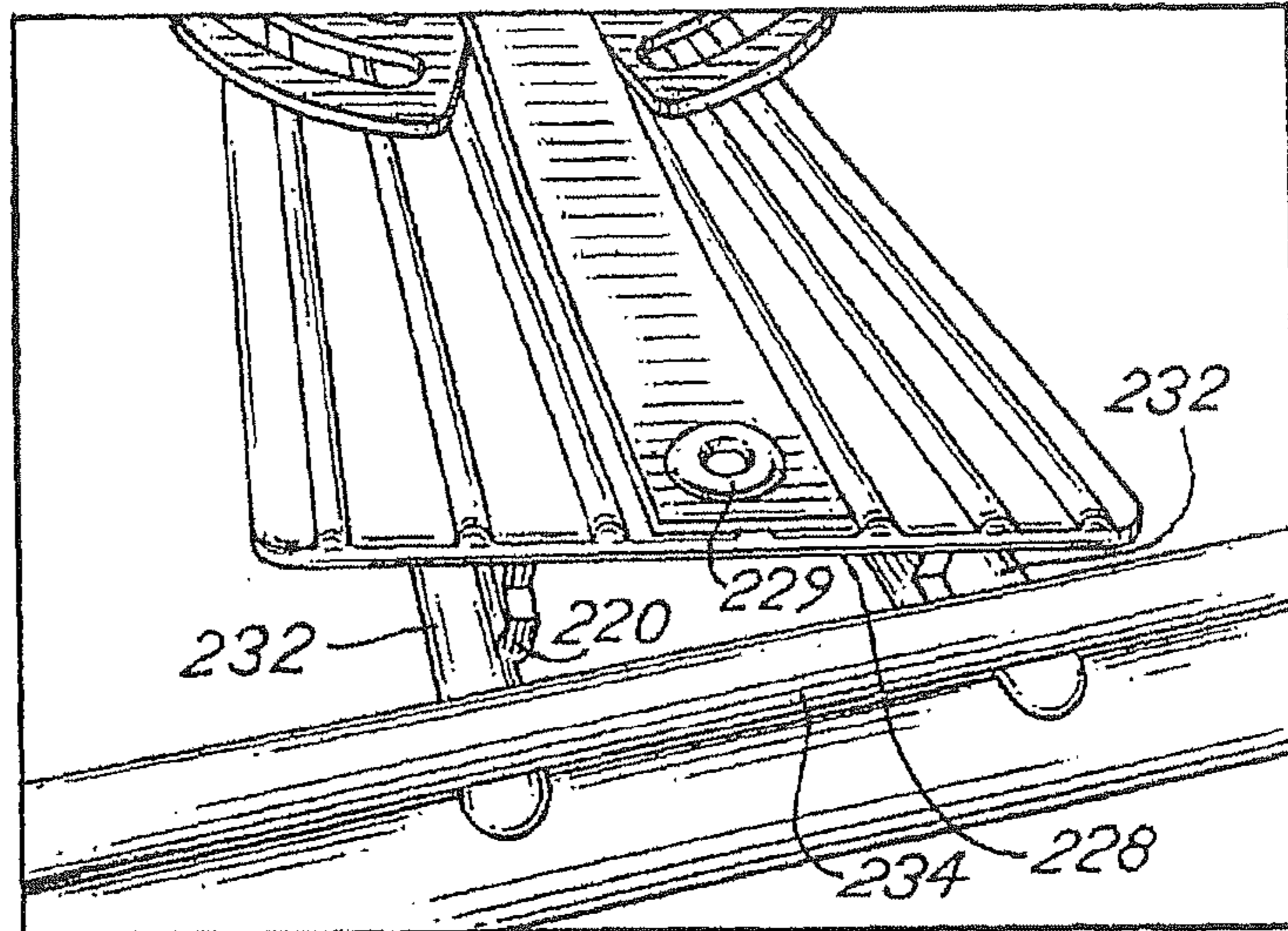


FIG.32

FIG. 33

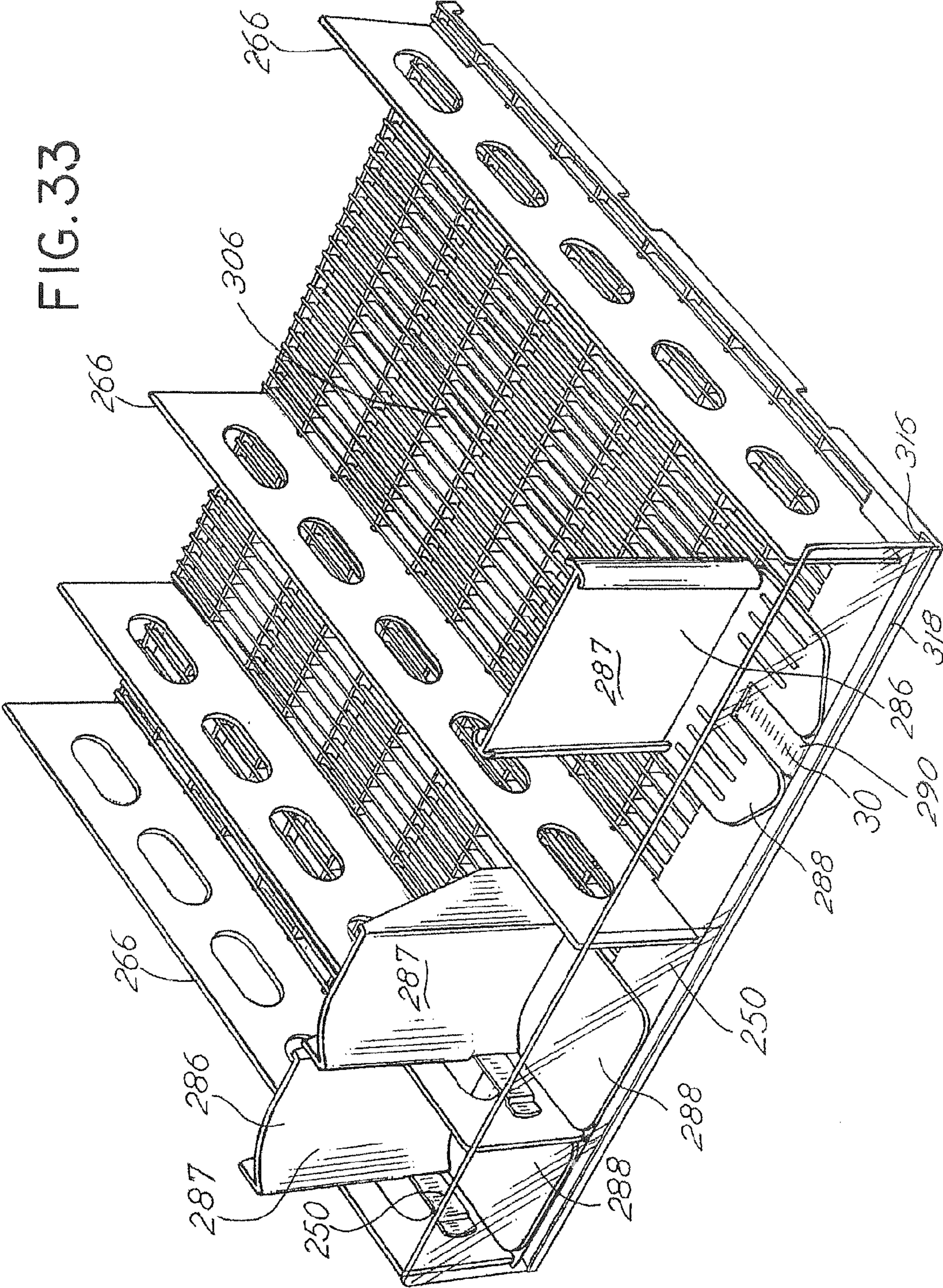
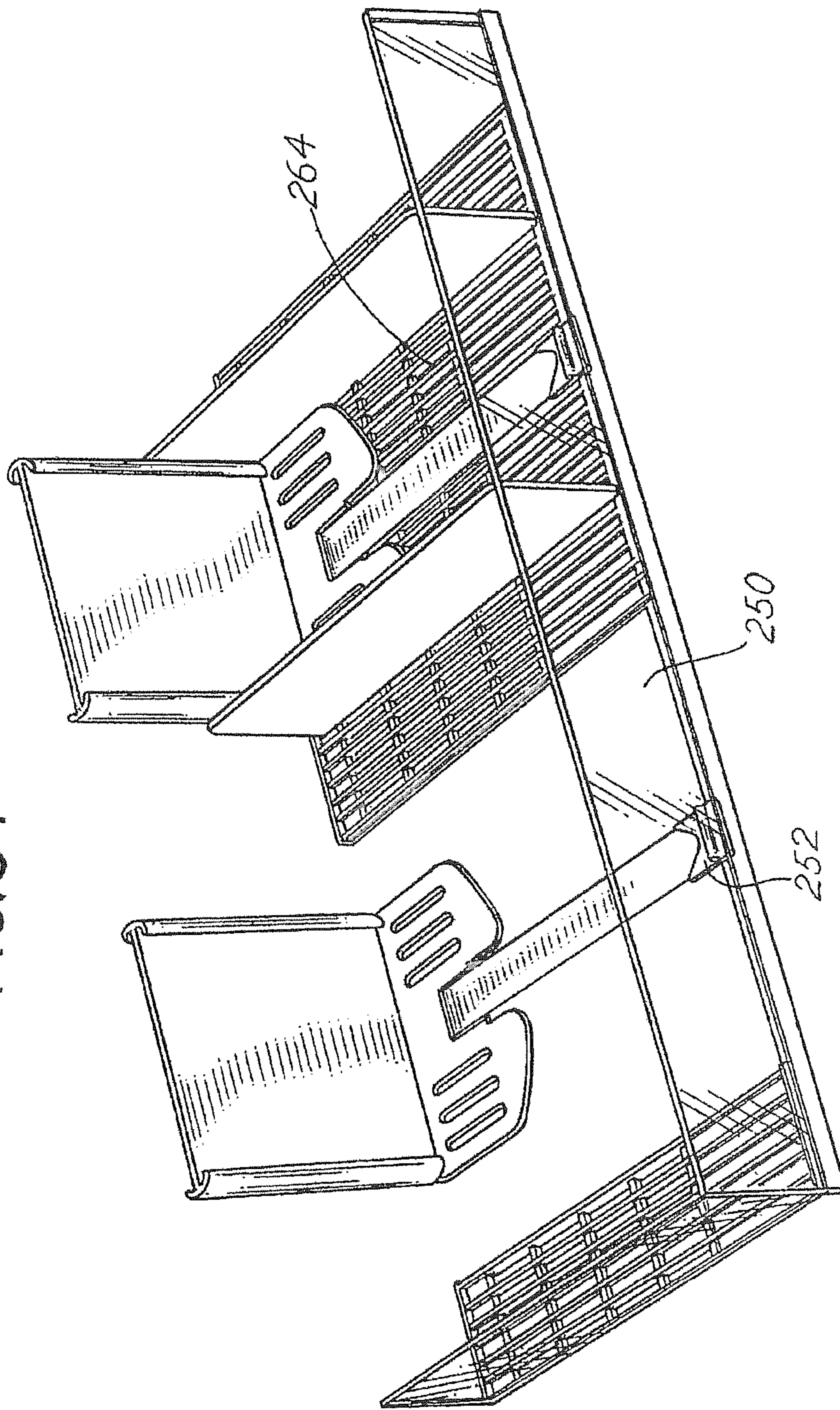
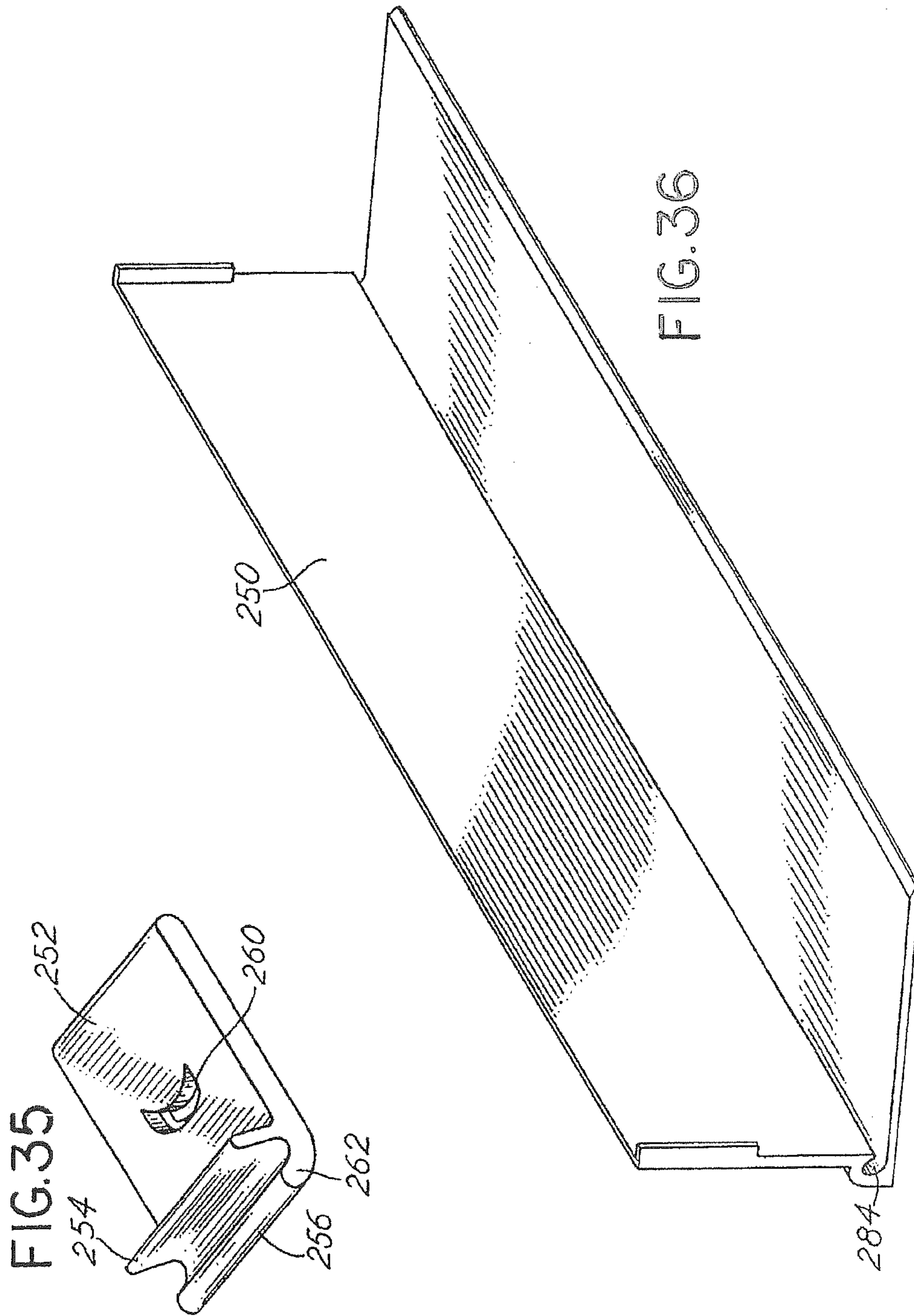
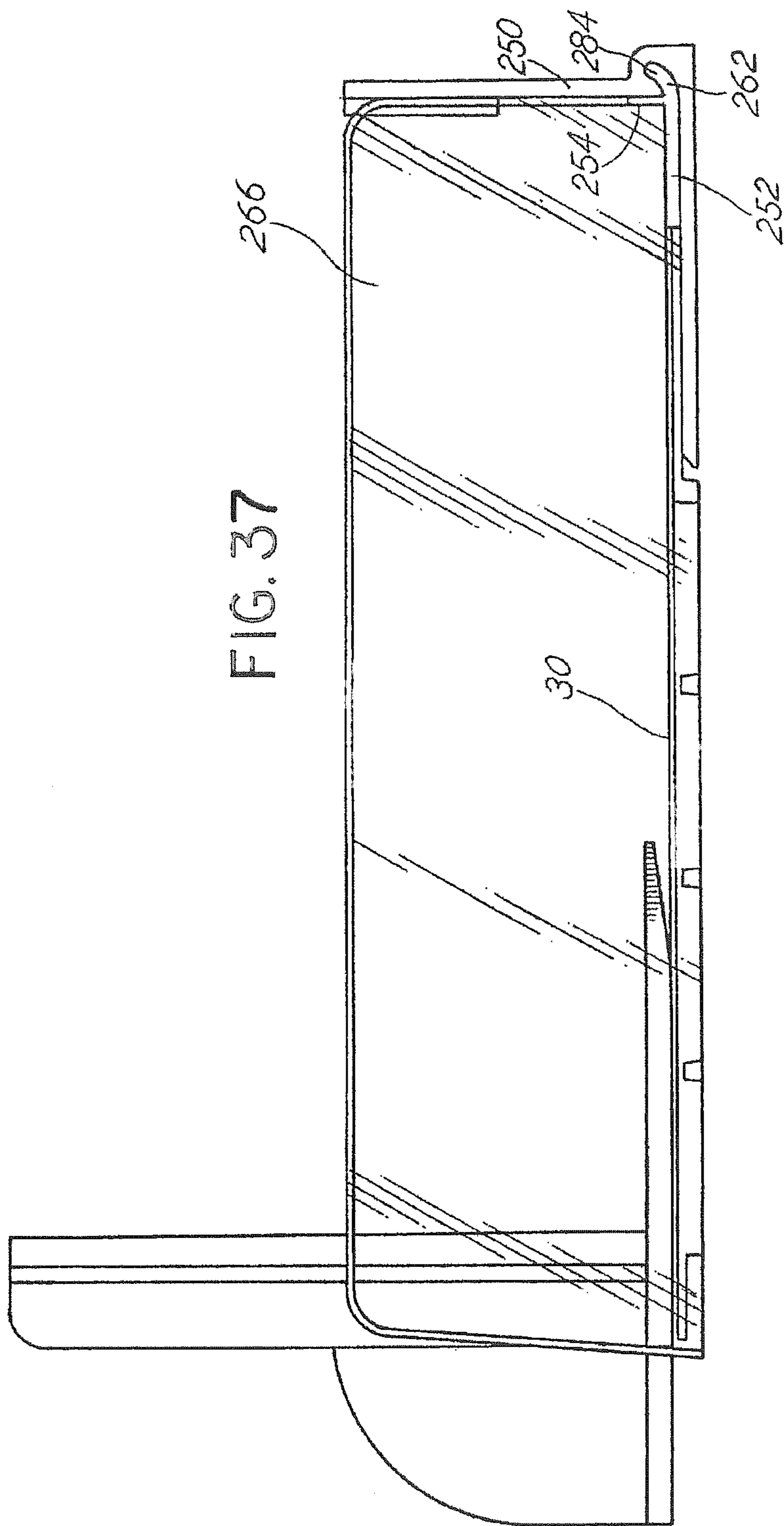
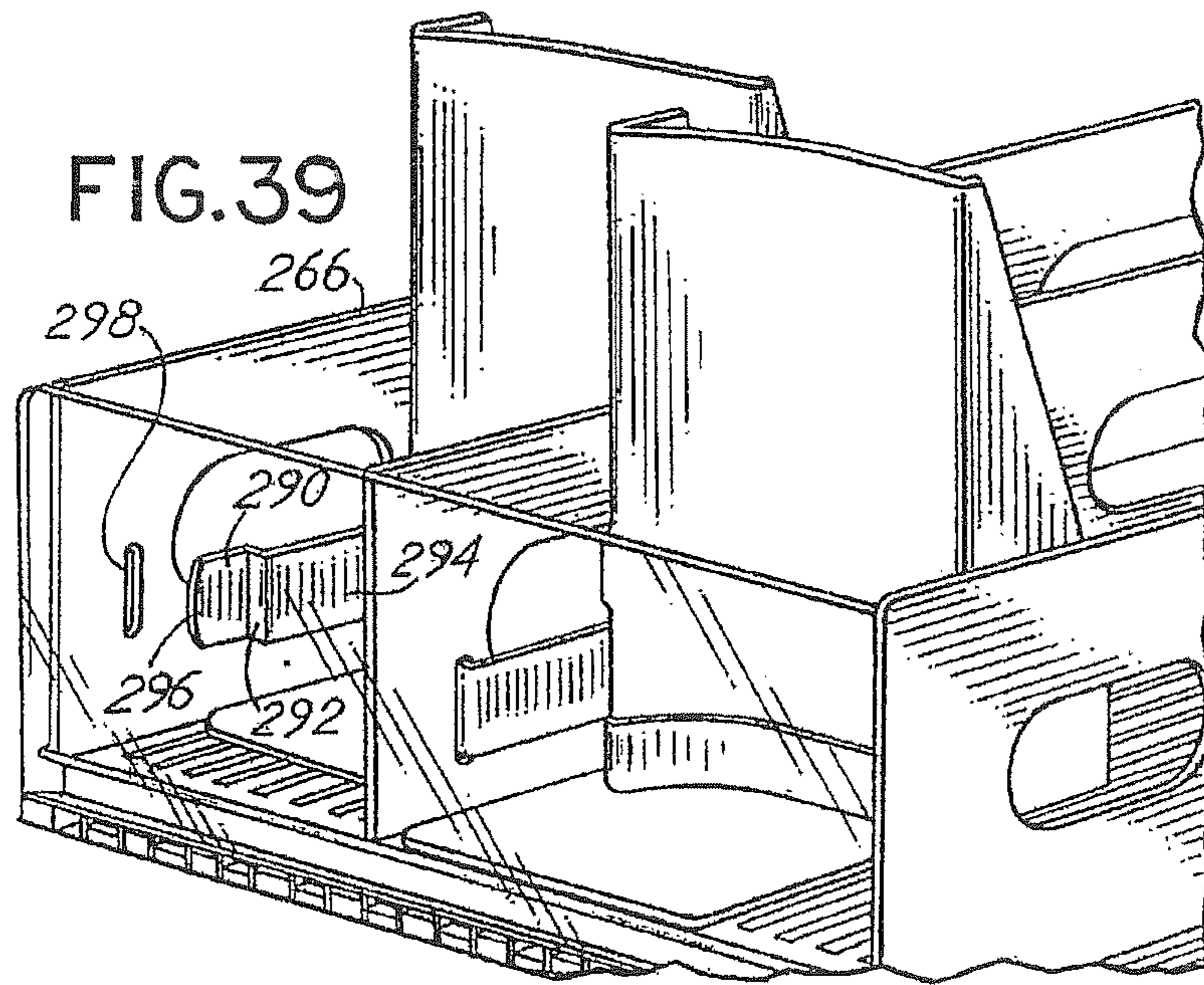
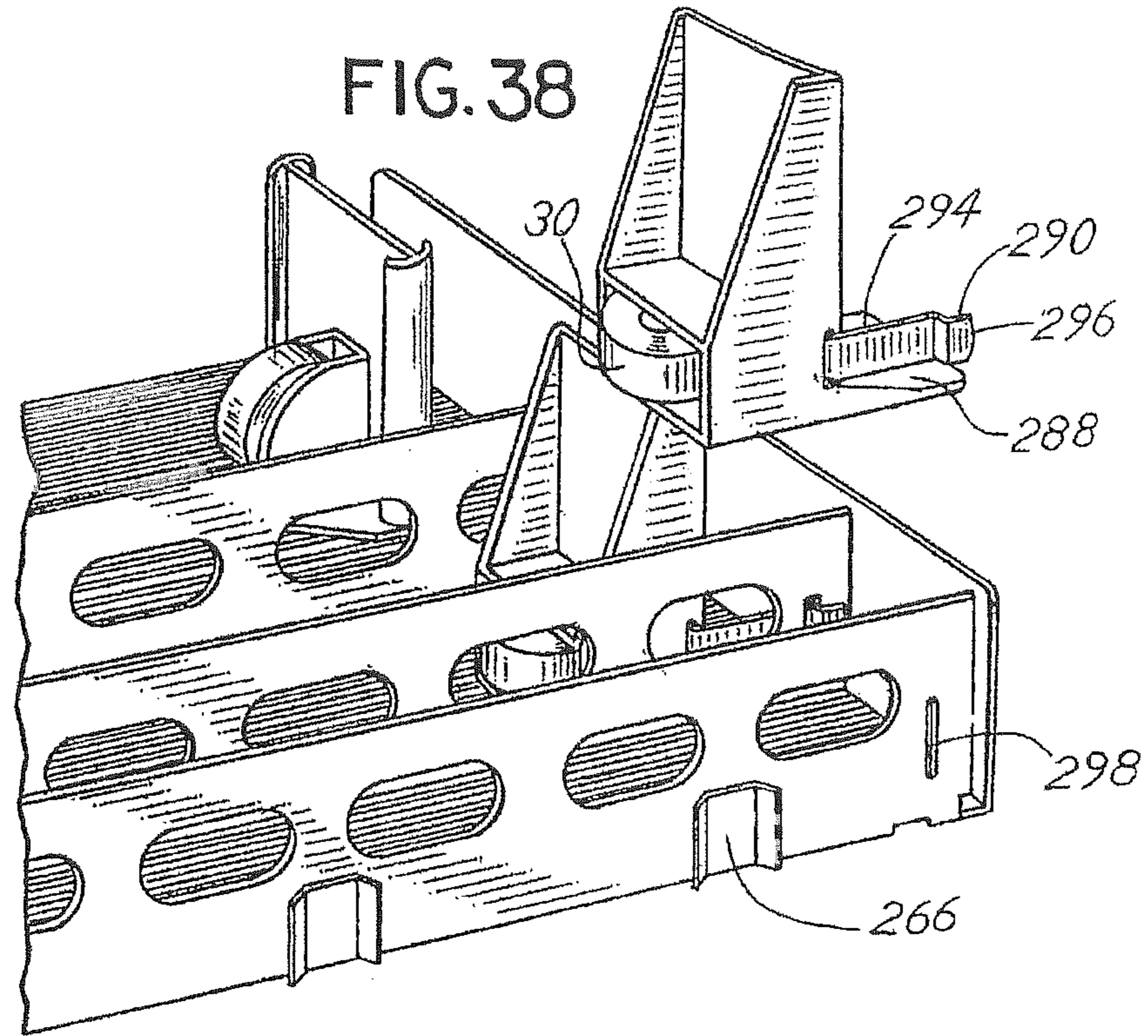


FIG. 34









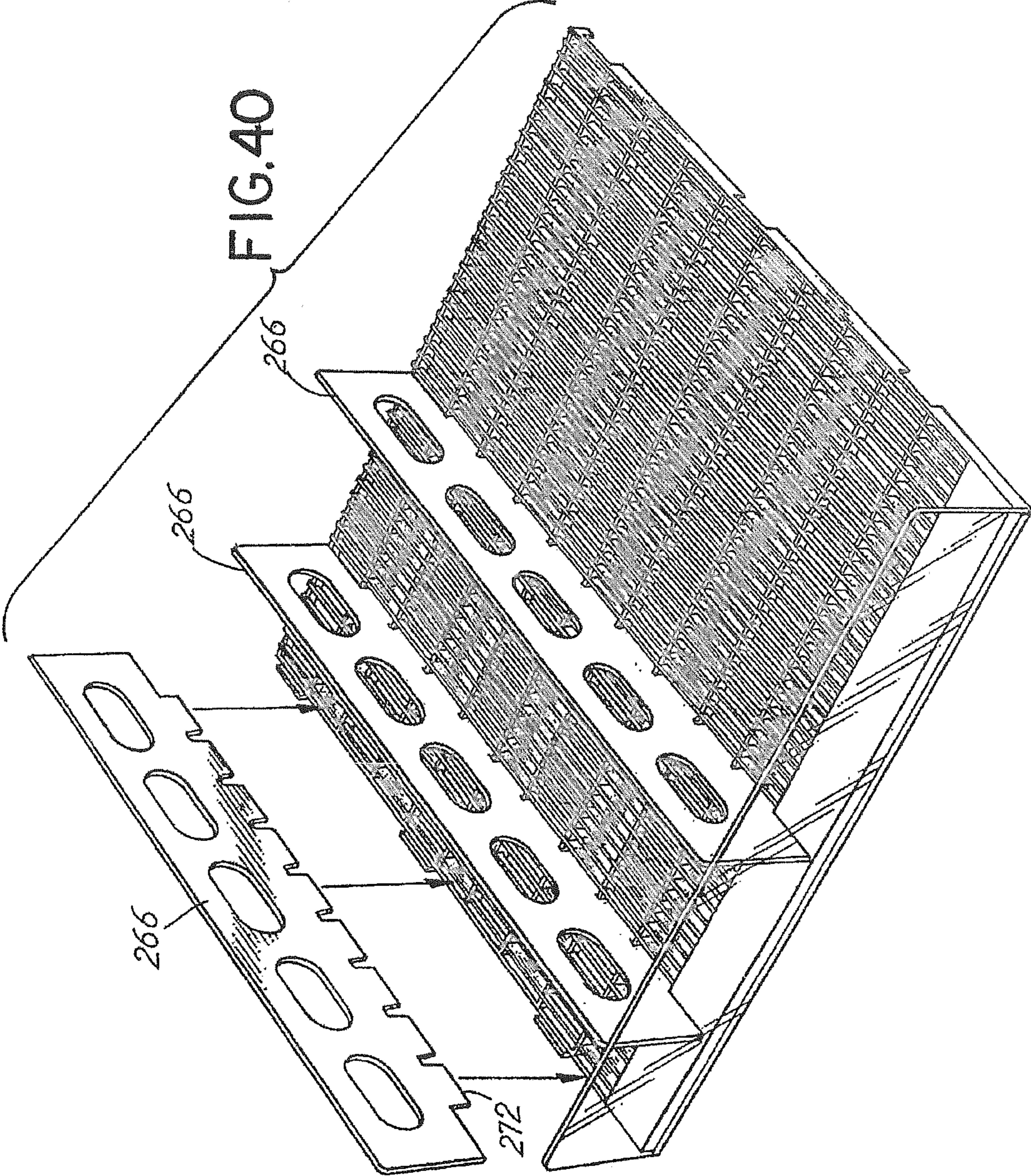


FIG.4IA

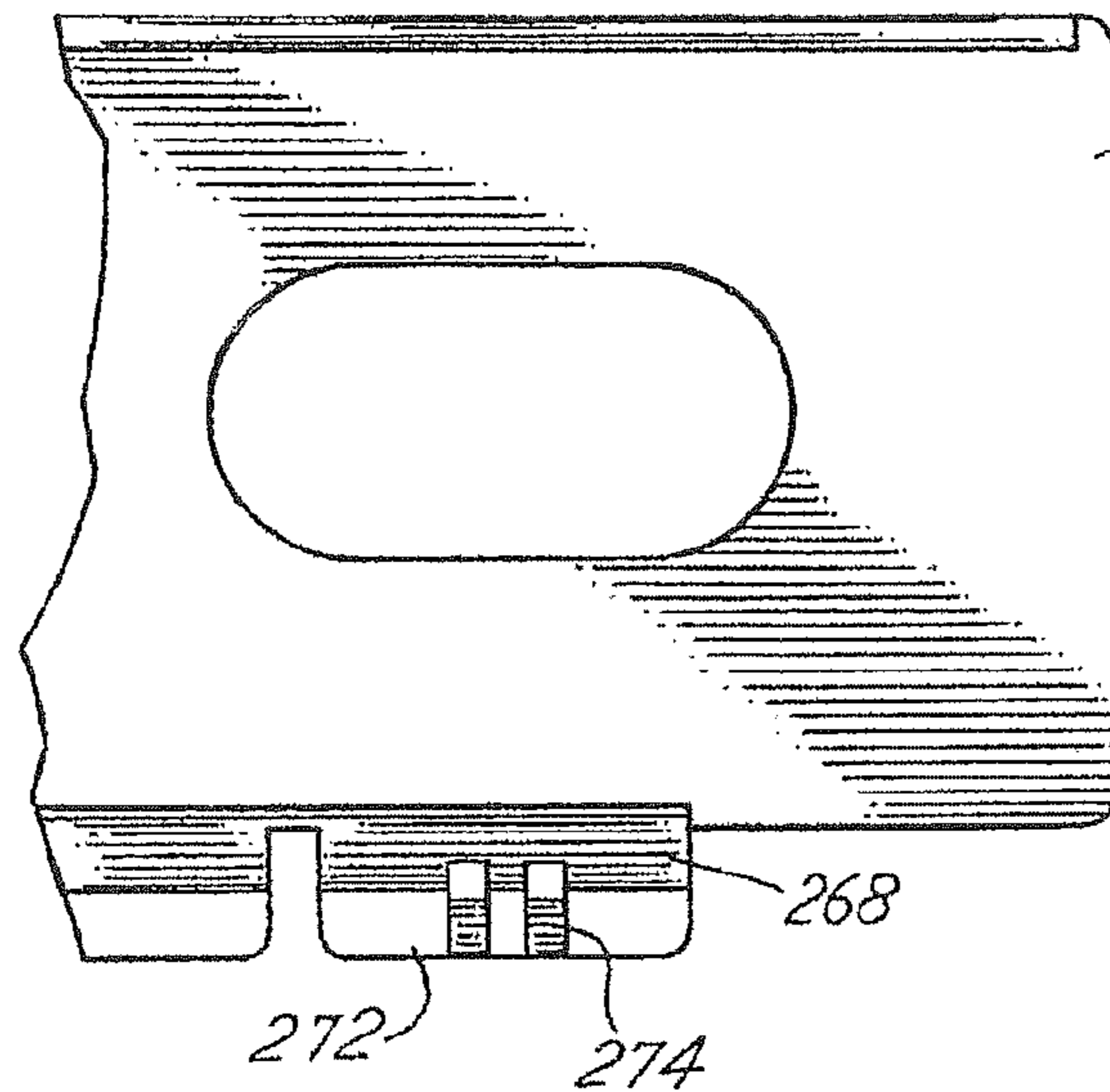


FIG.4ID

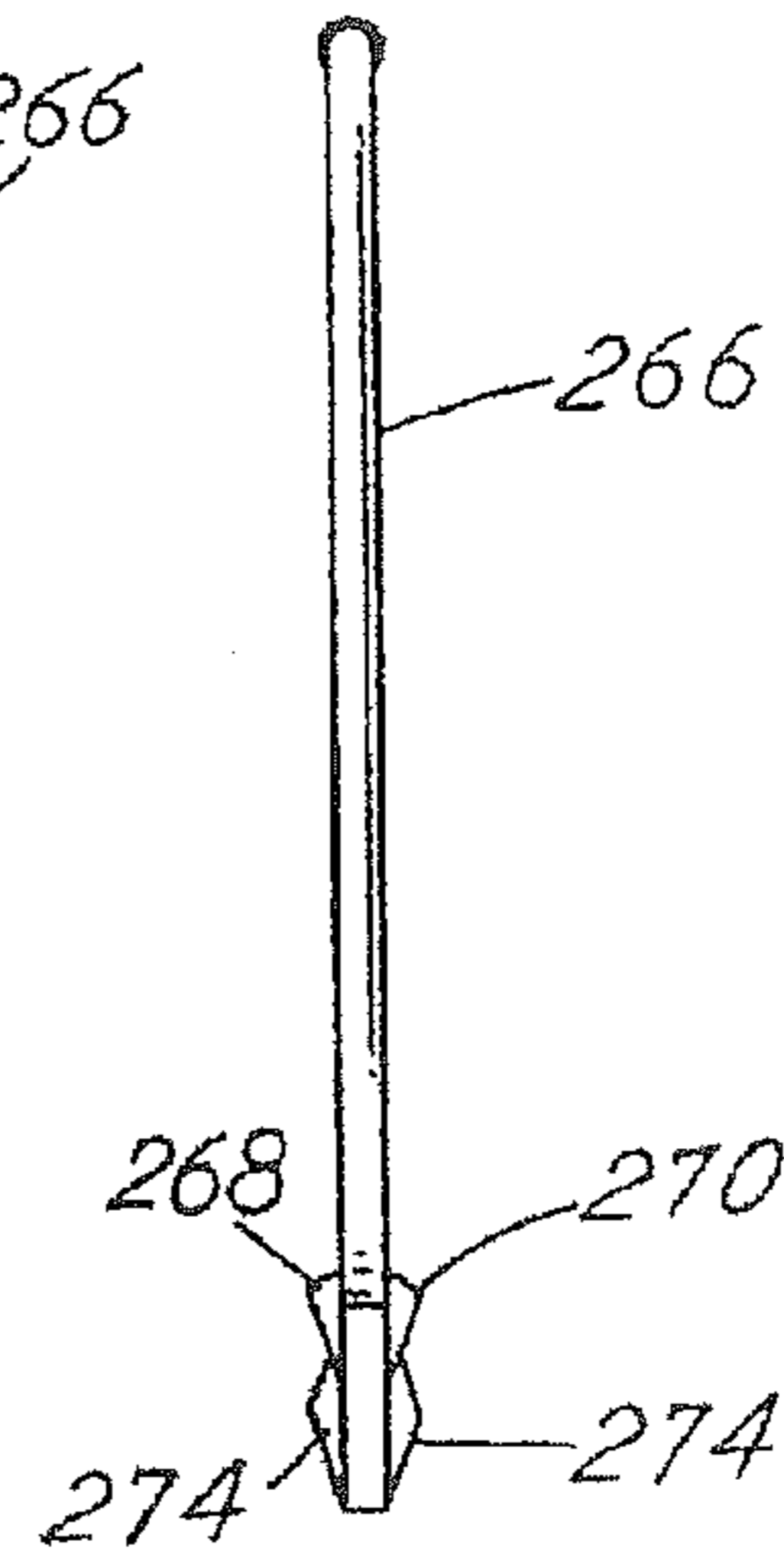


FIG.4IC

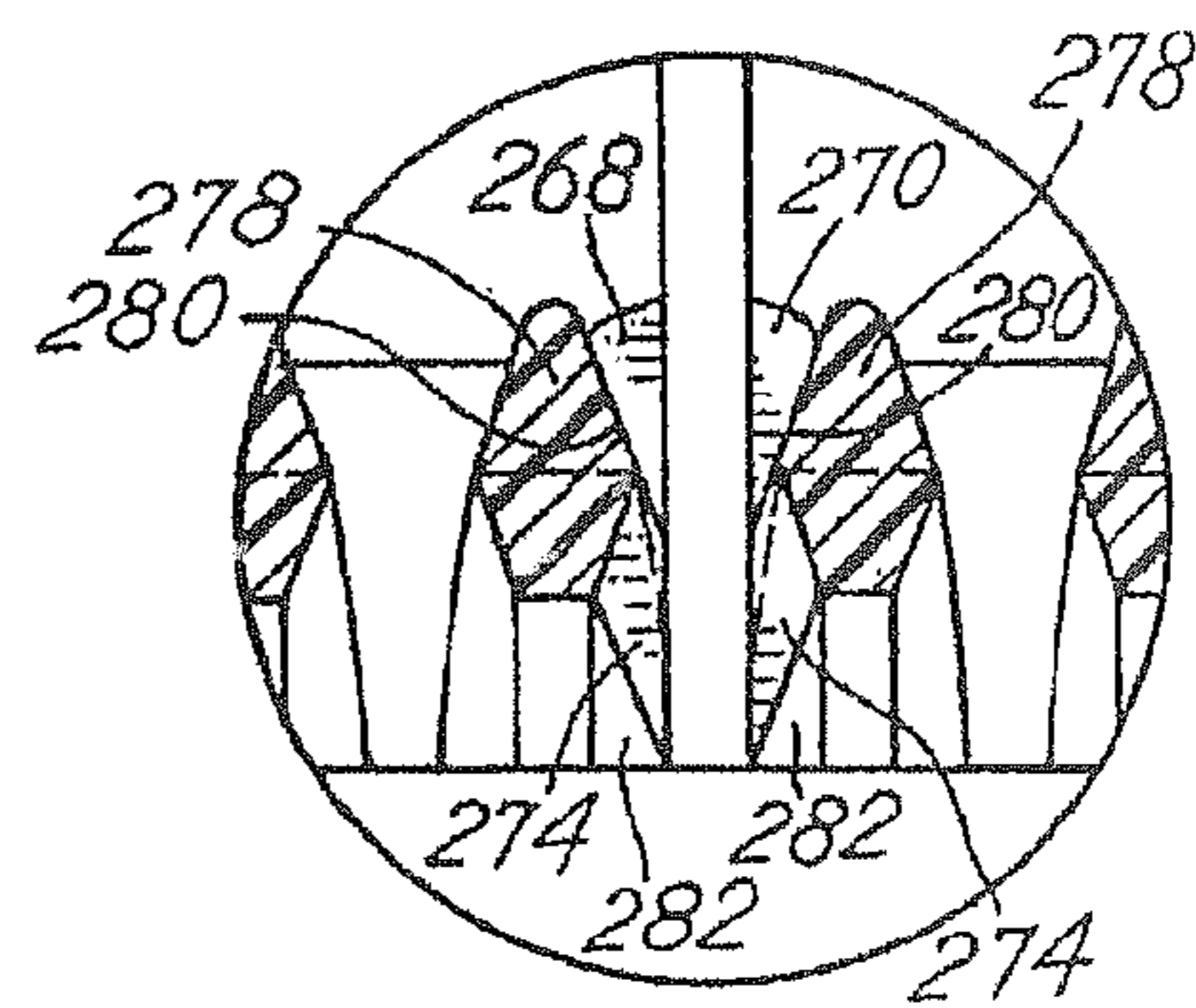
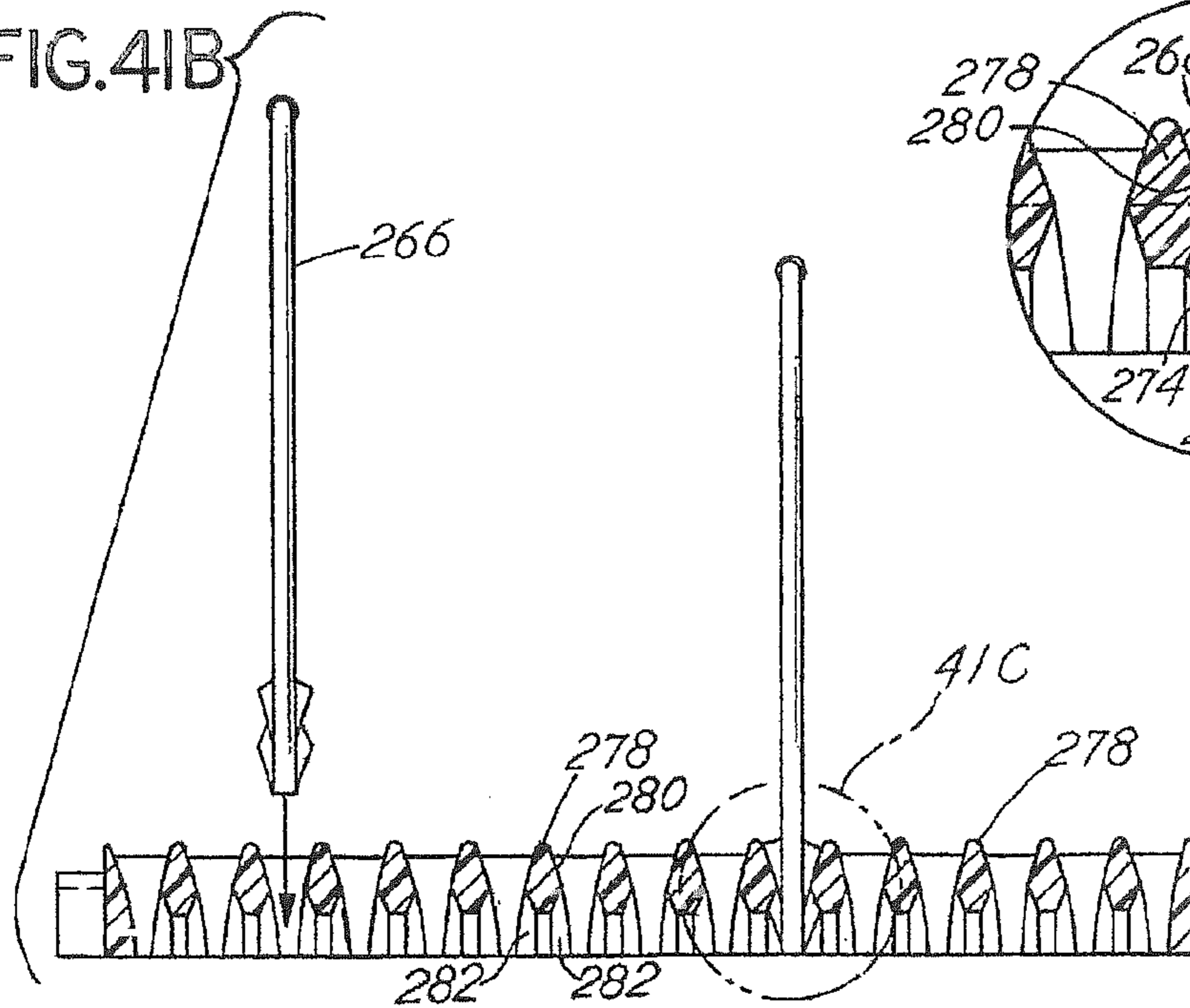
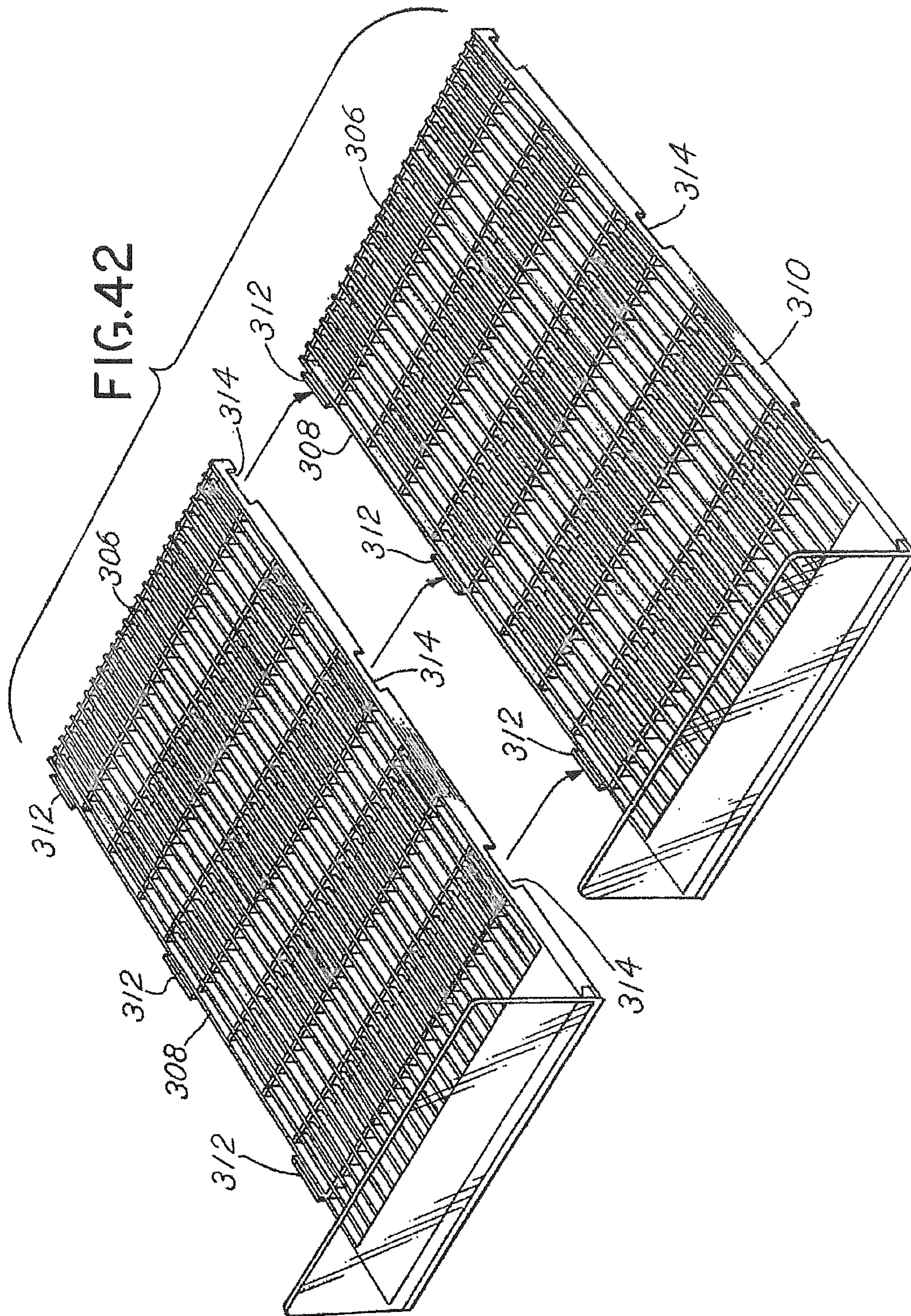
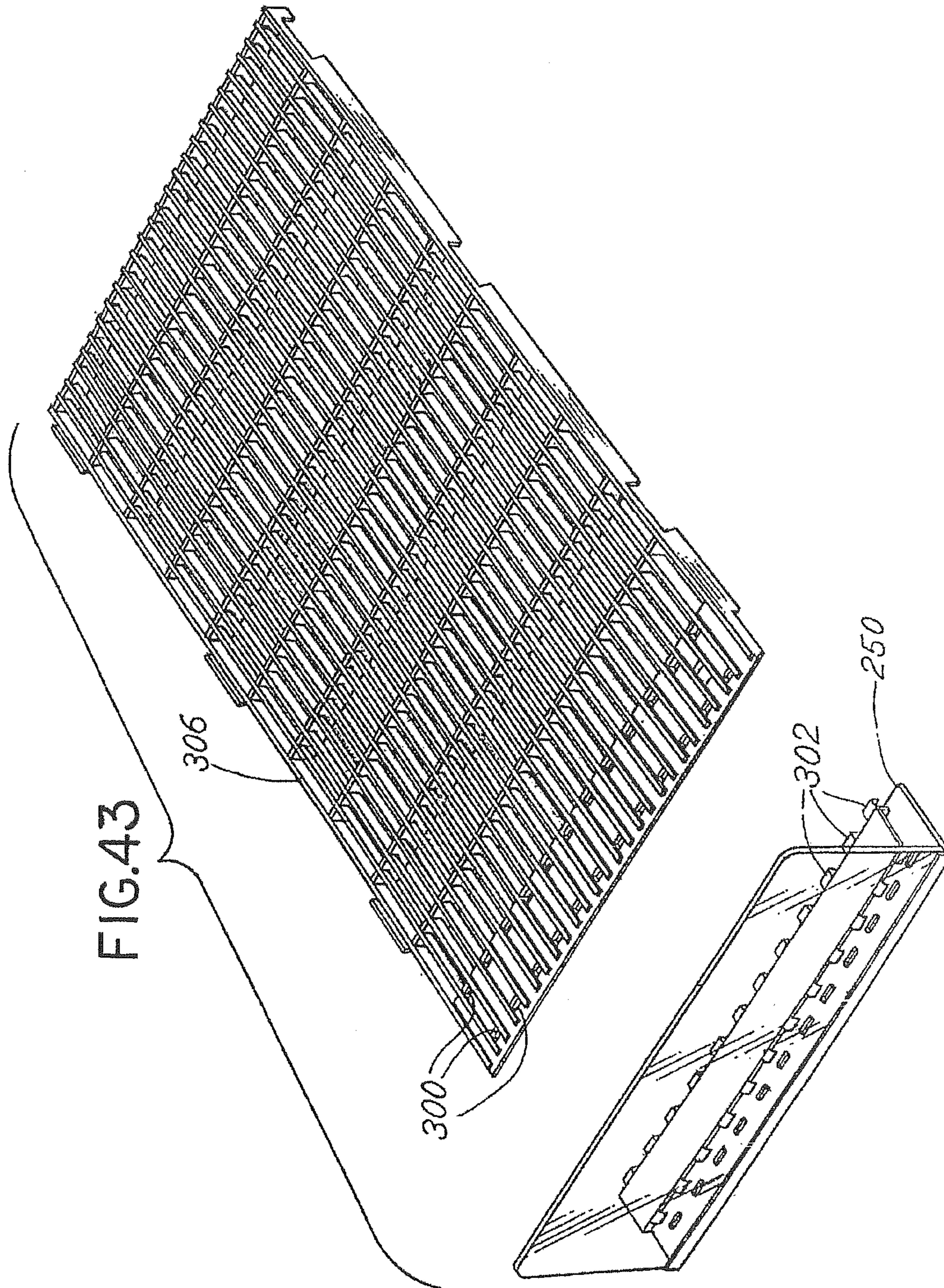


FIG.4IB







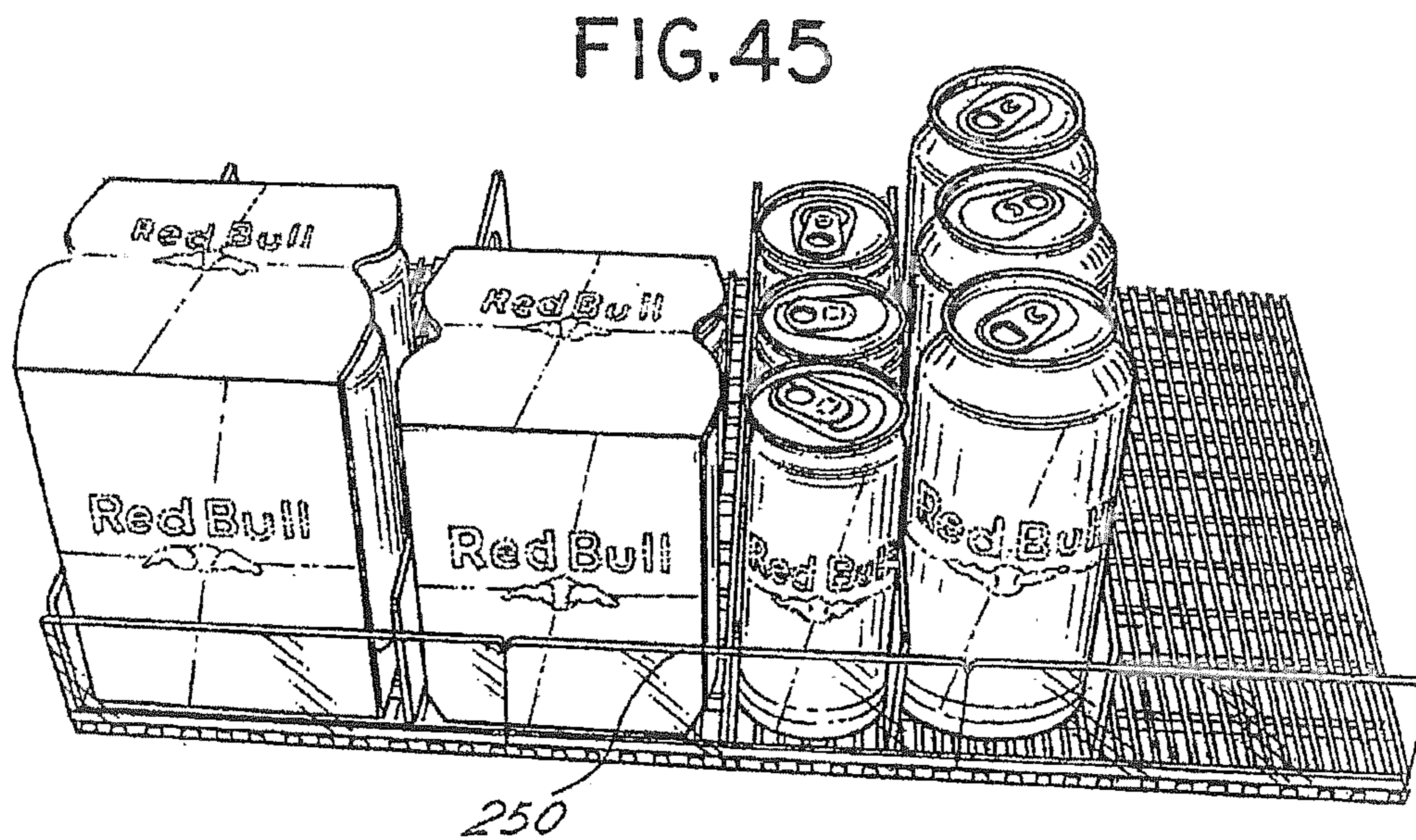
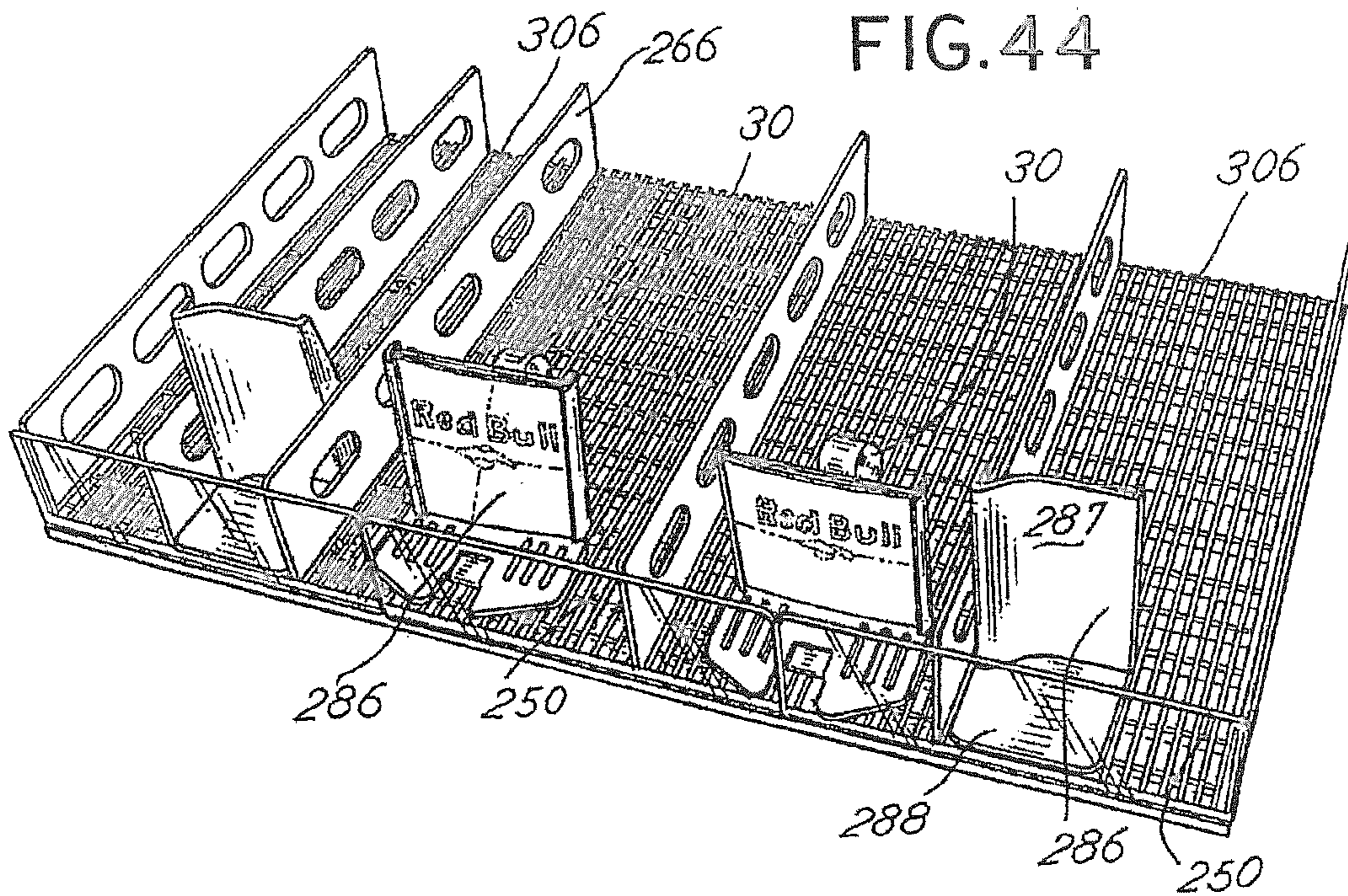


FIG.48

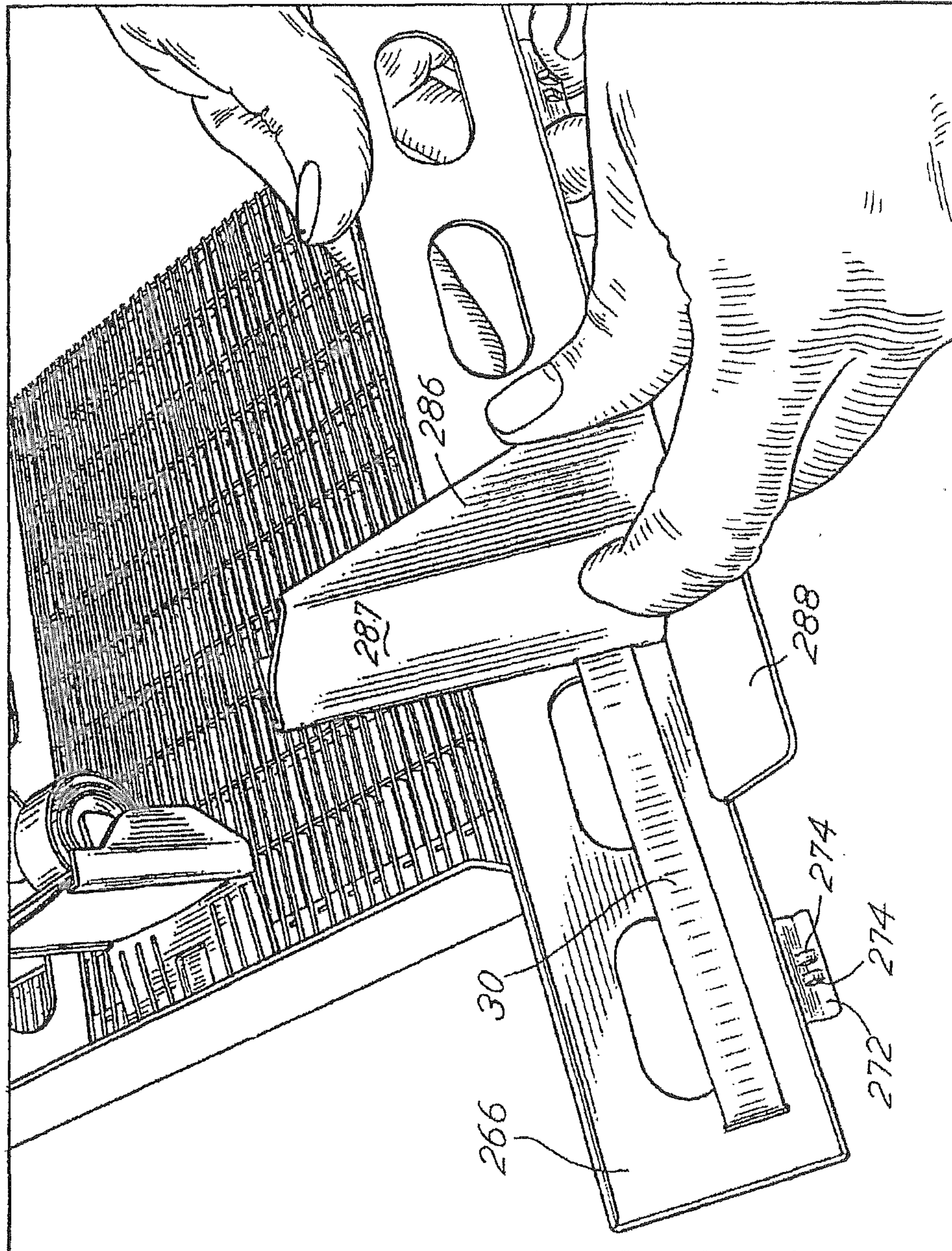
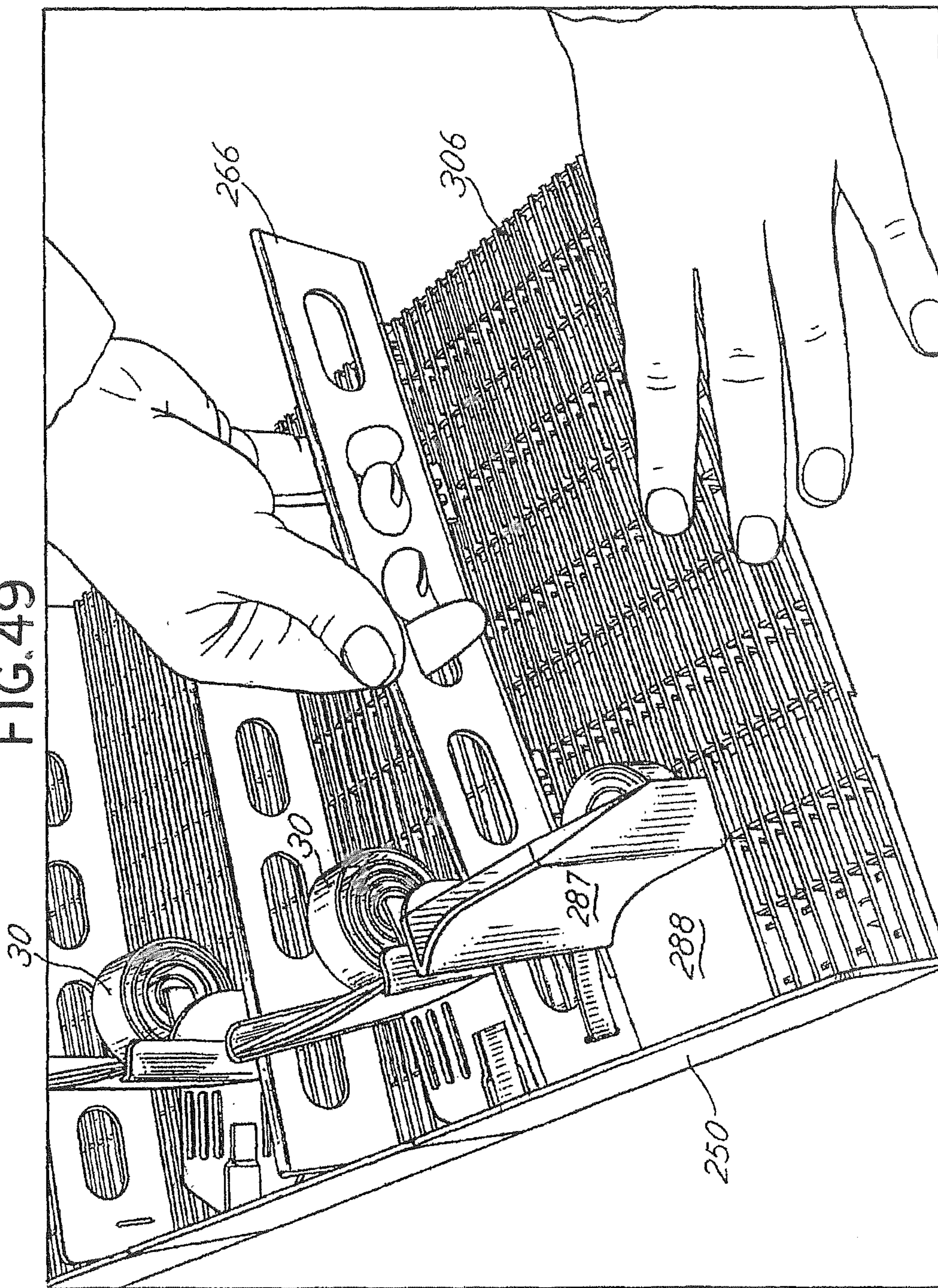
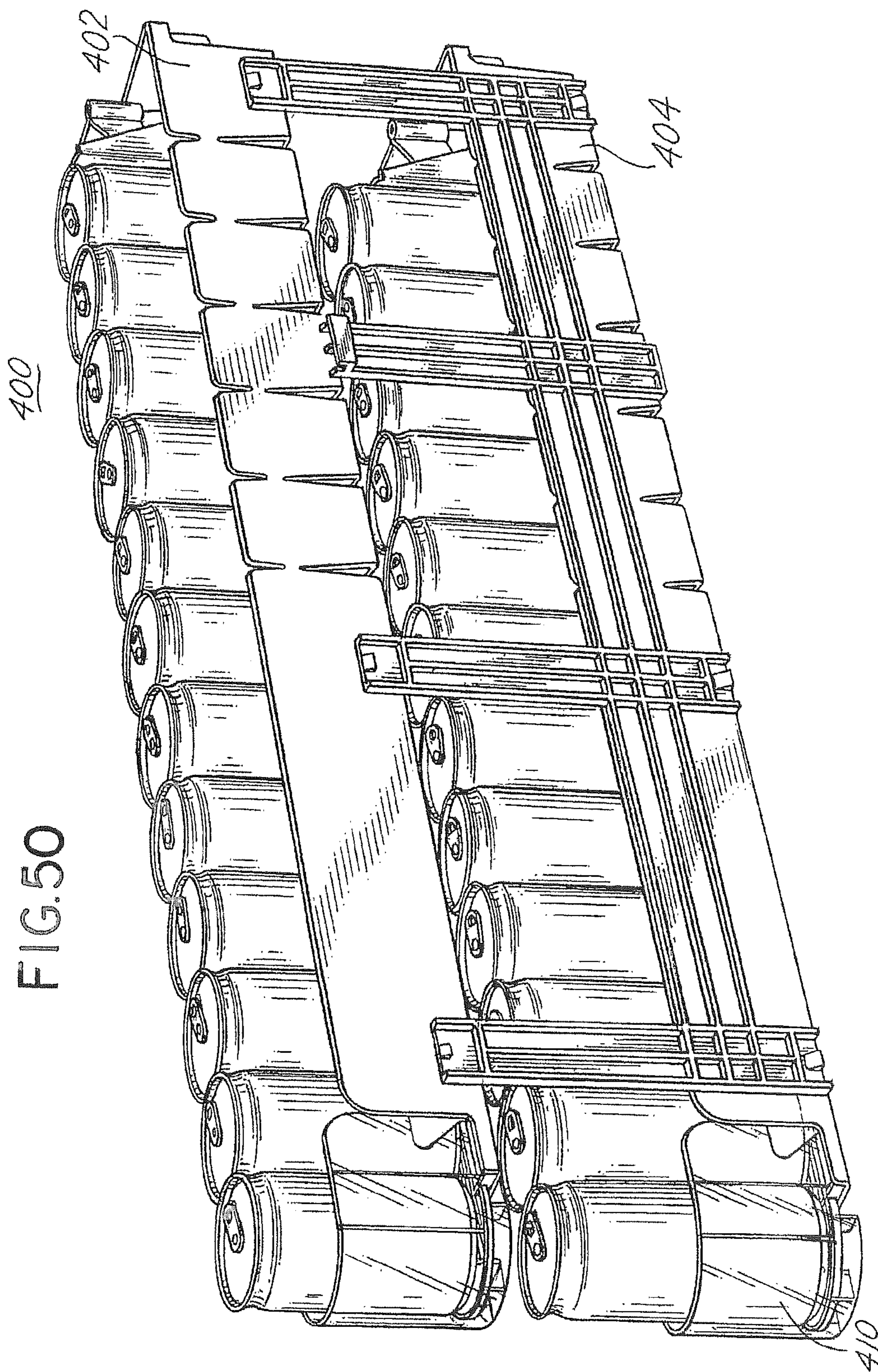


FIG. 49





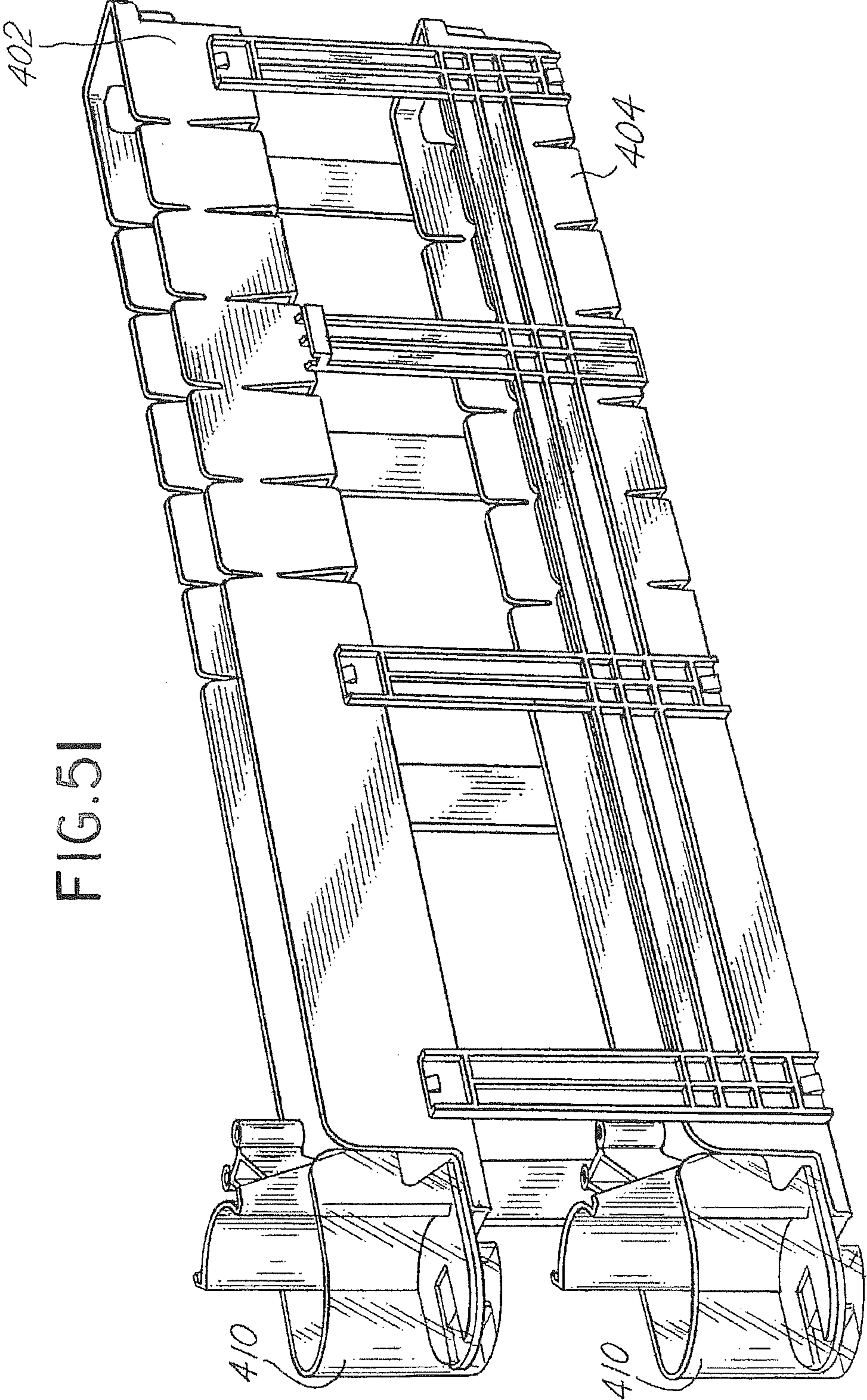


FIG. 51

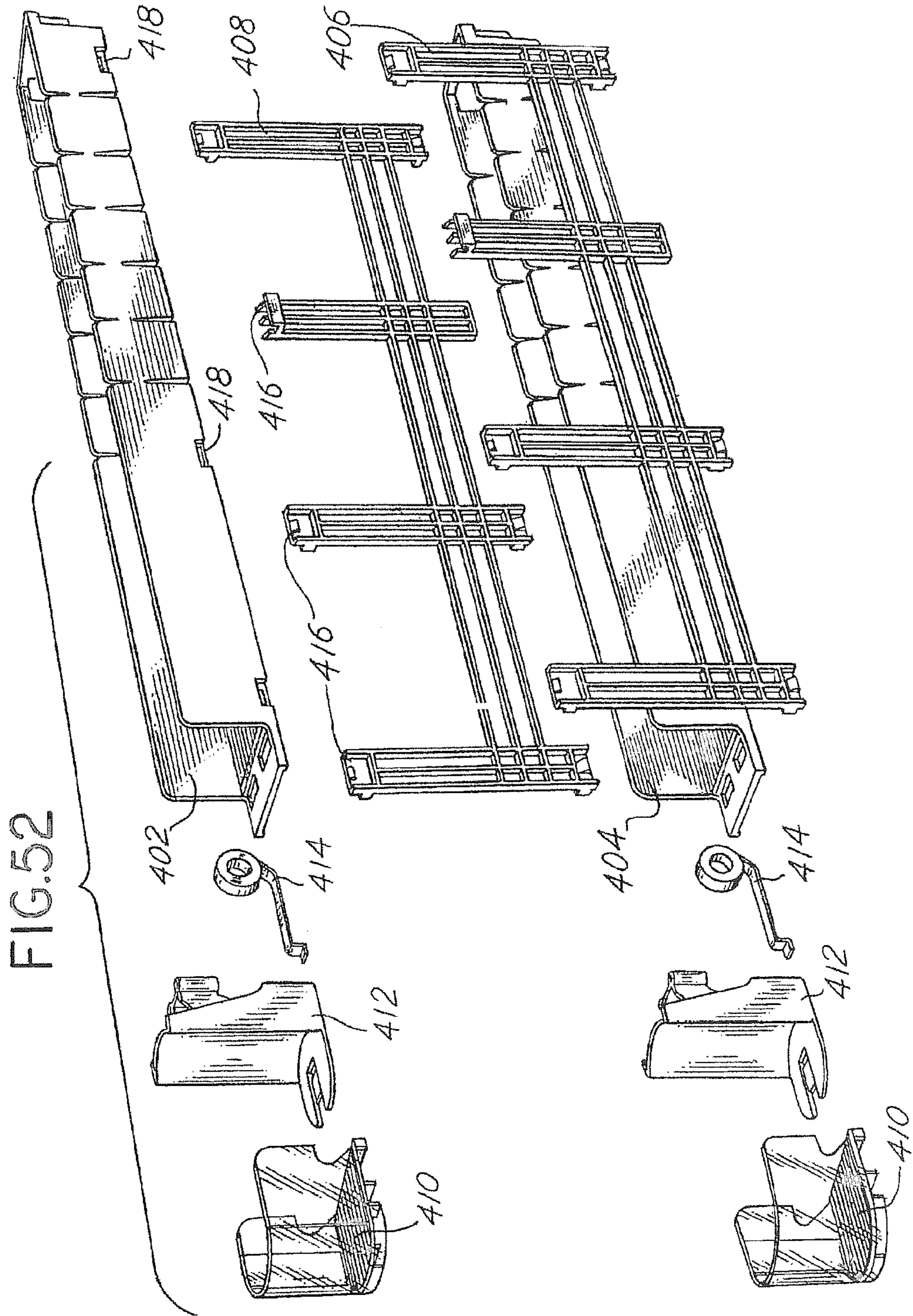


FIG. 53

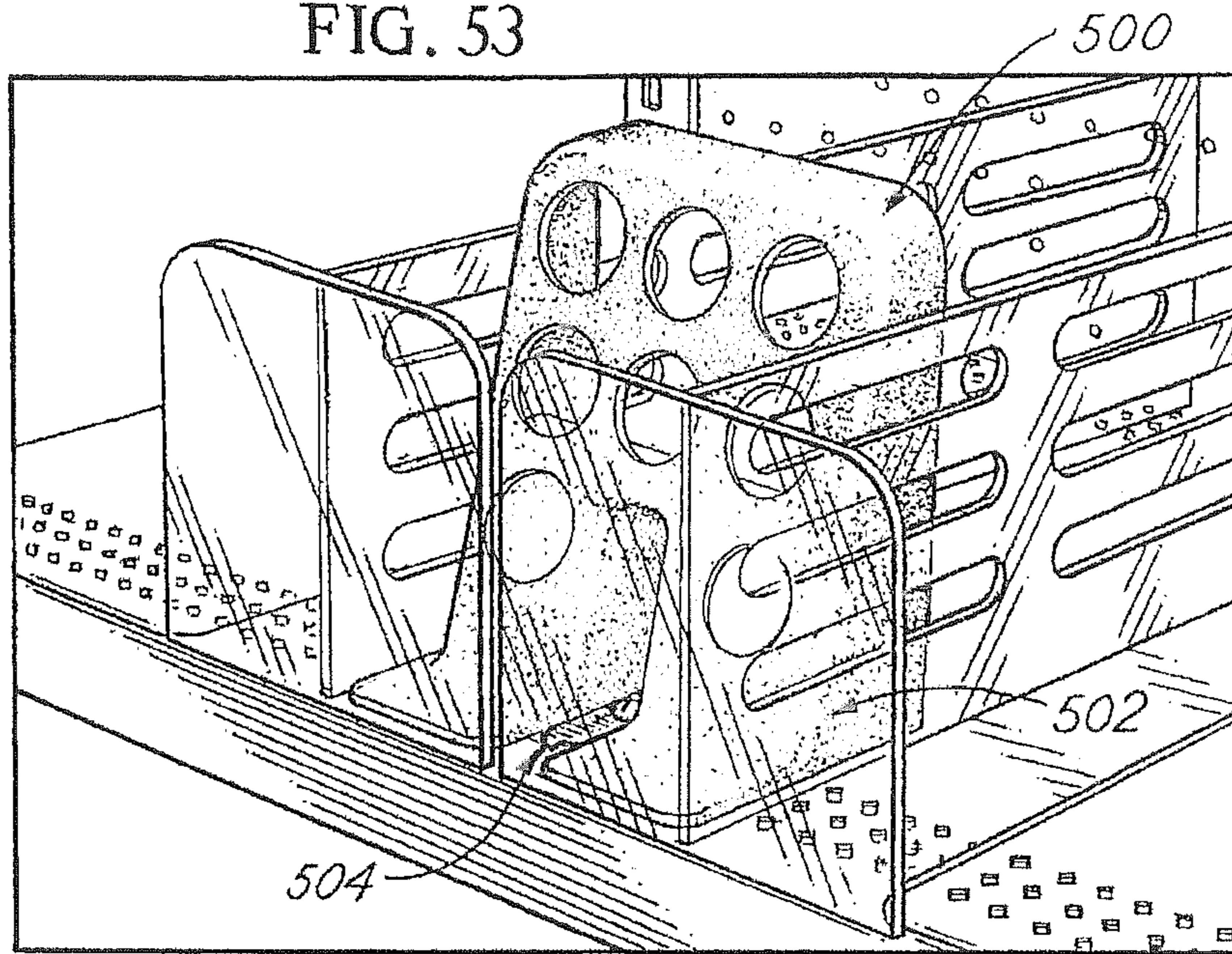


FIG. 54

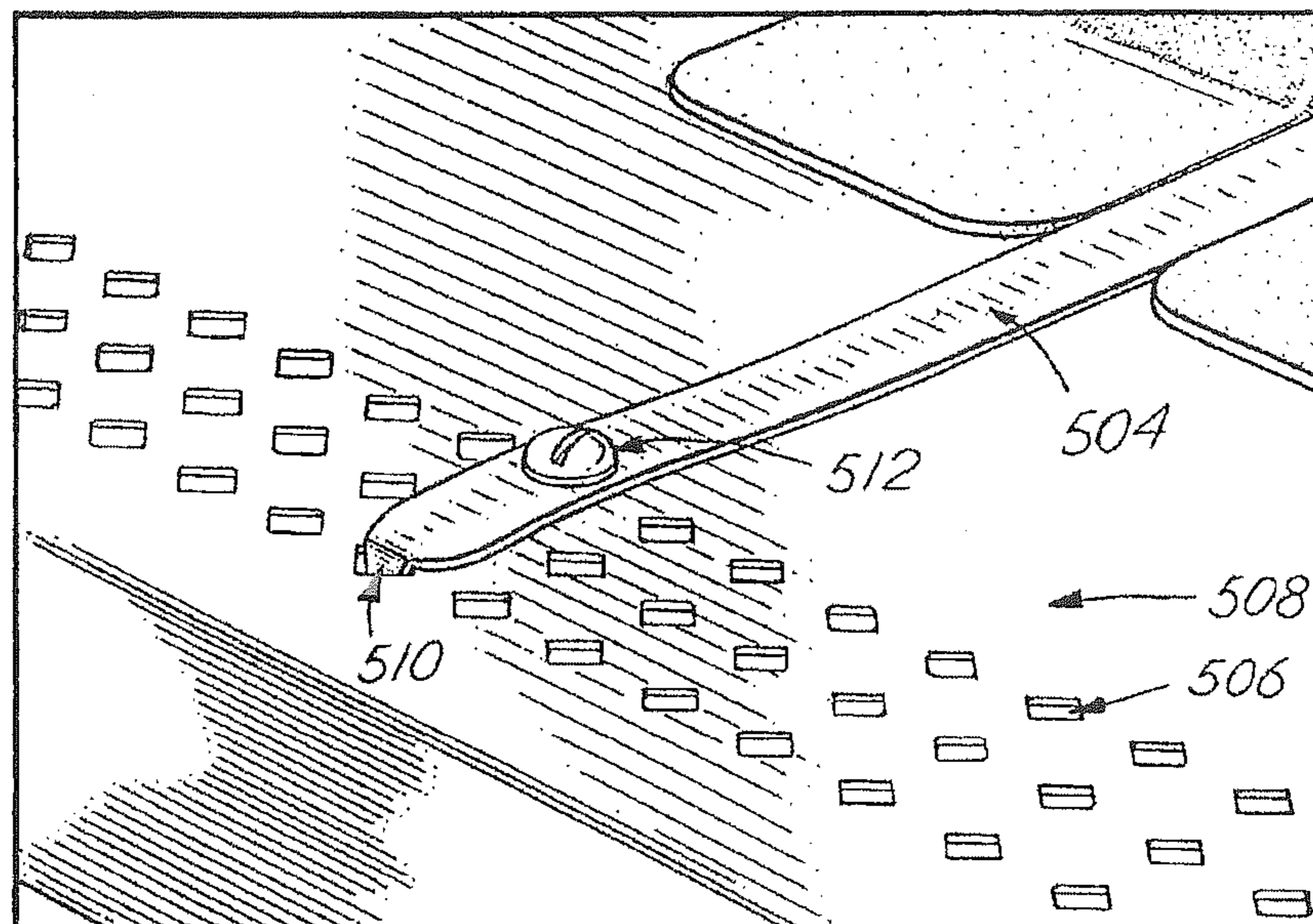


FIG. 55

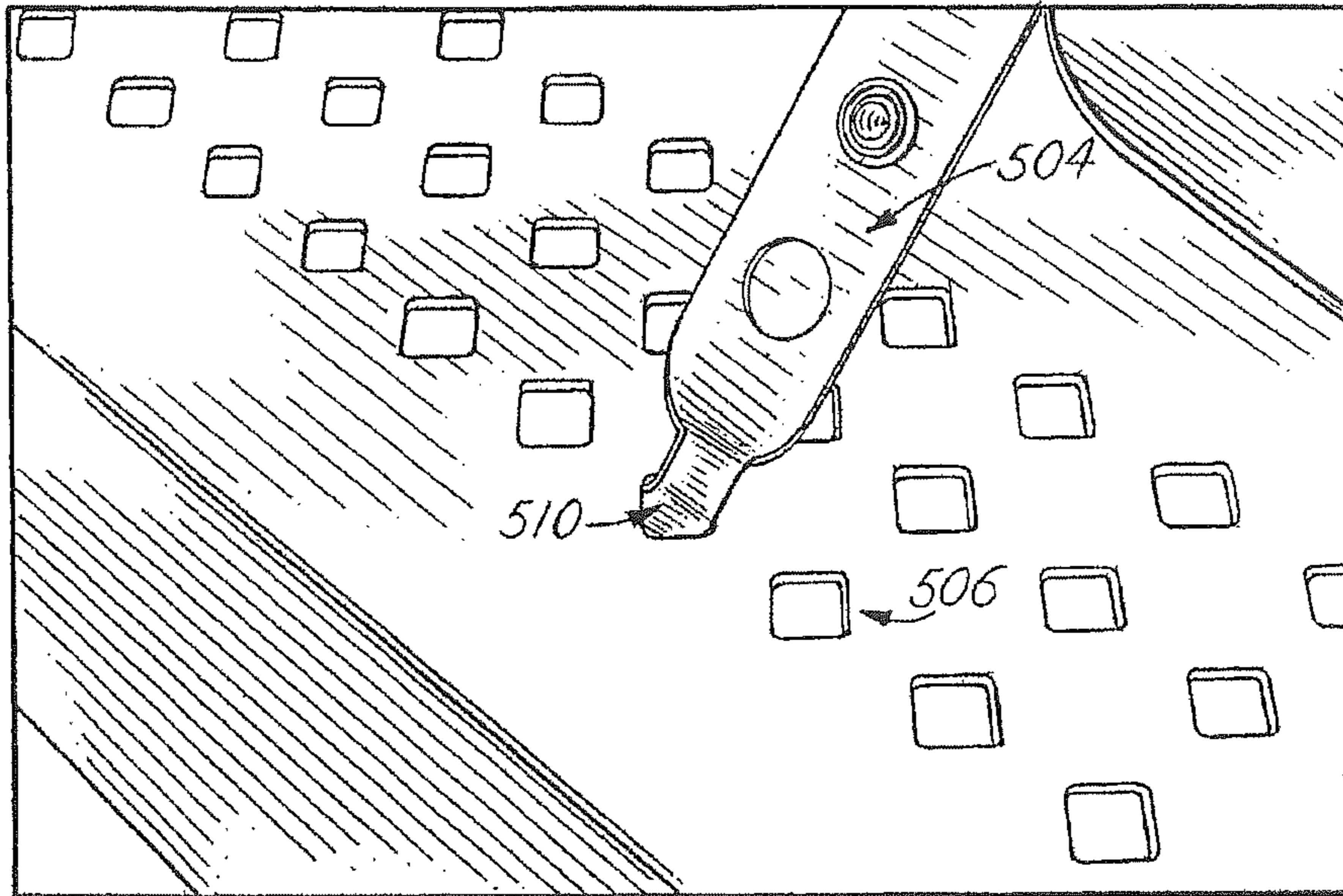


FIG. 56

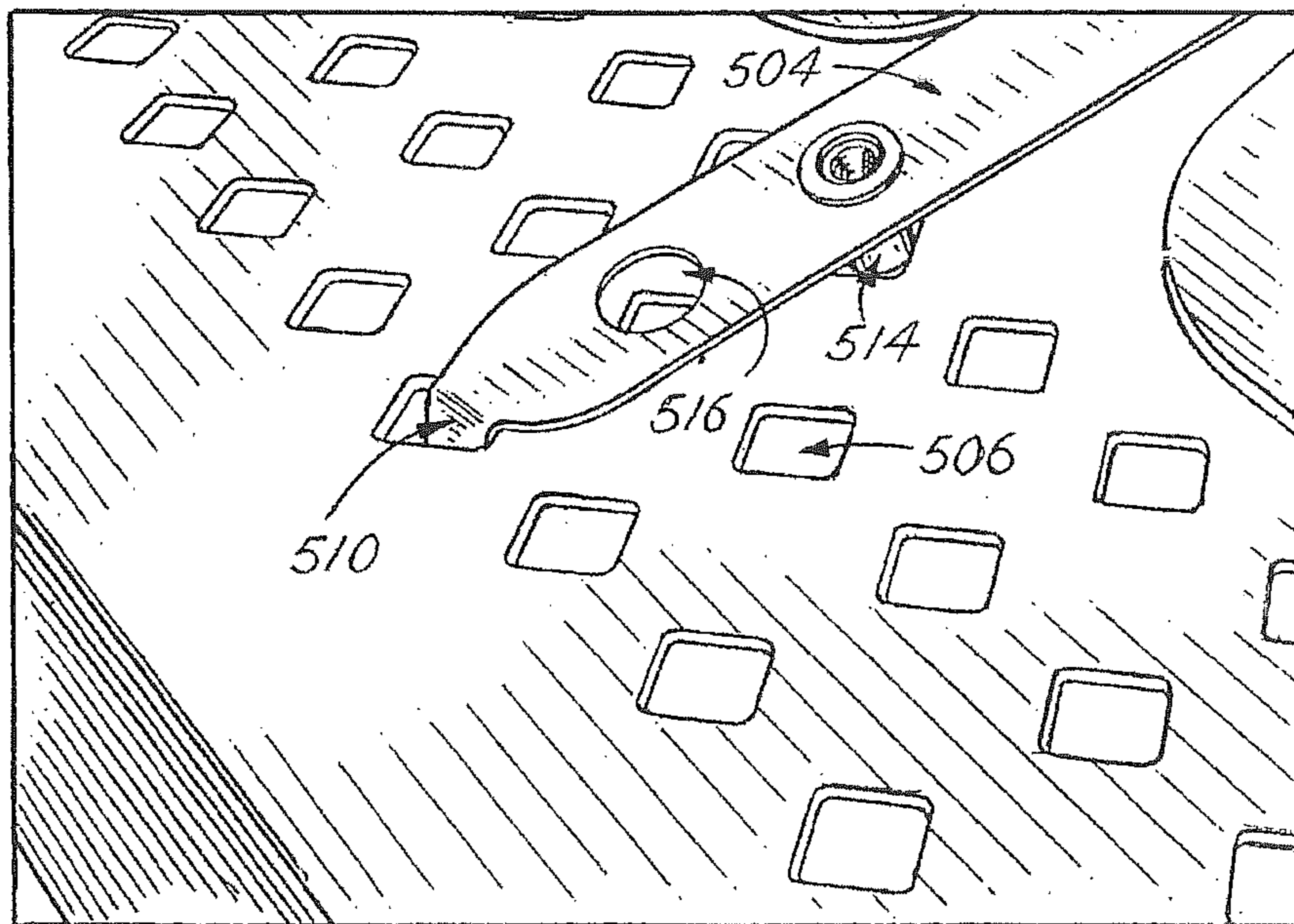
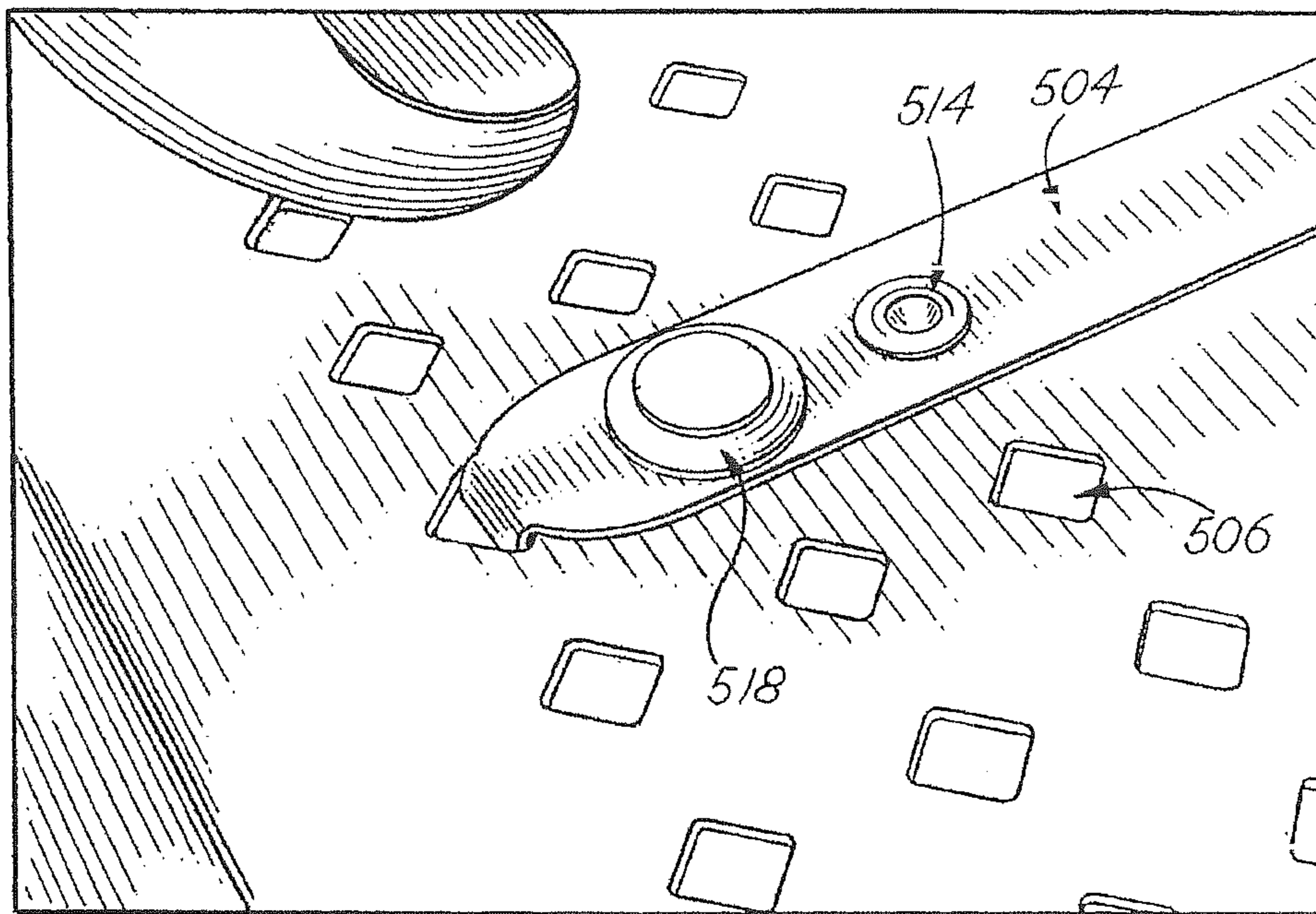


FIG. 57



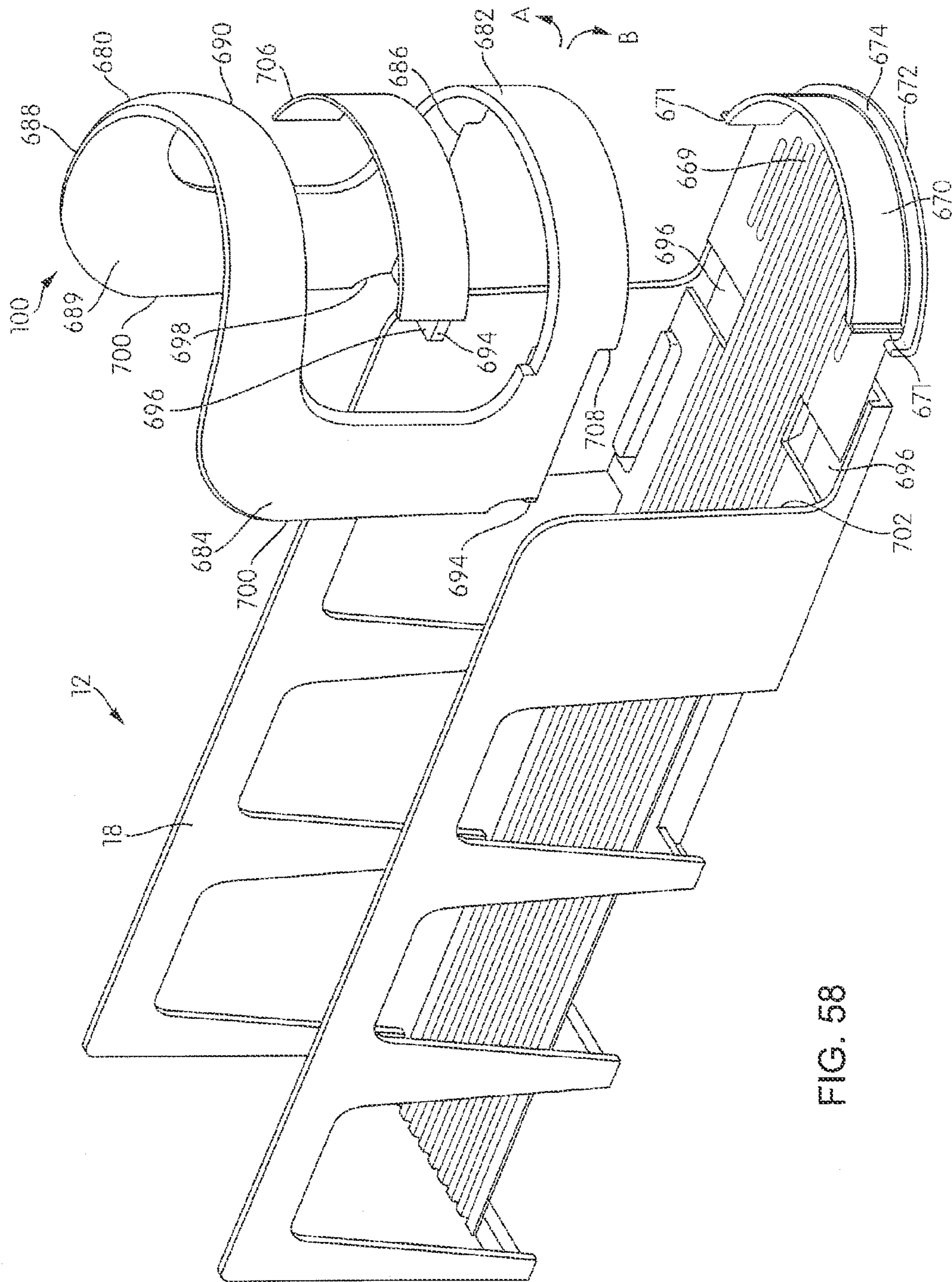


FIG. 58

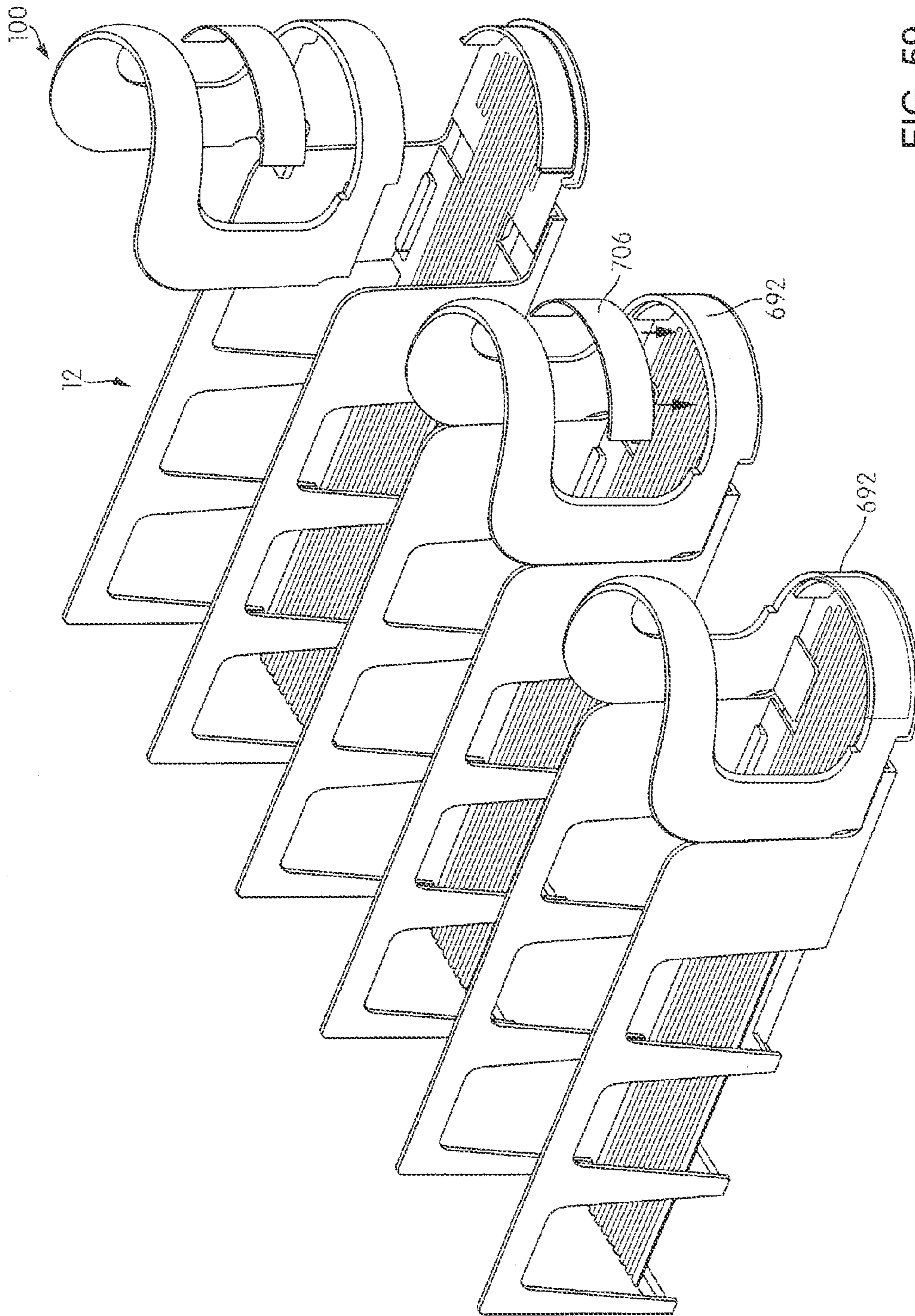


FIG. 59

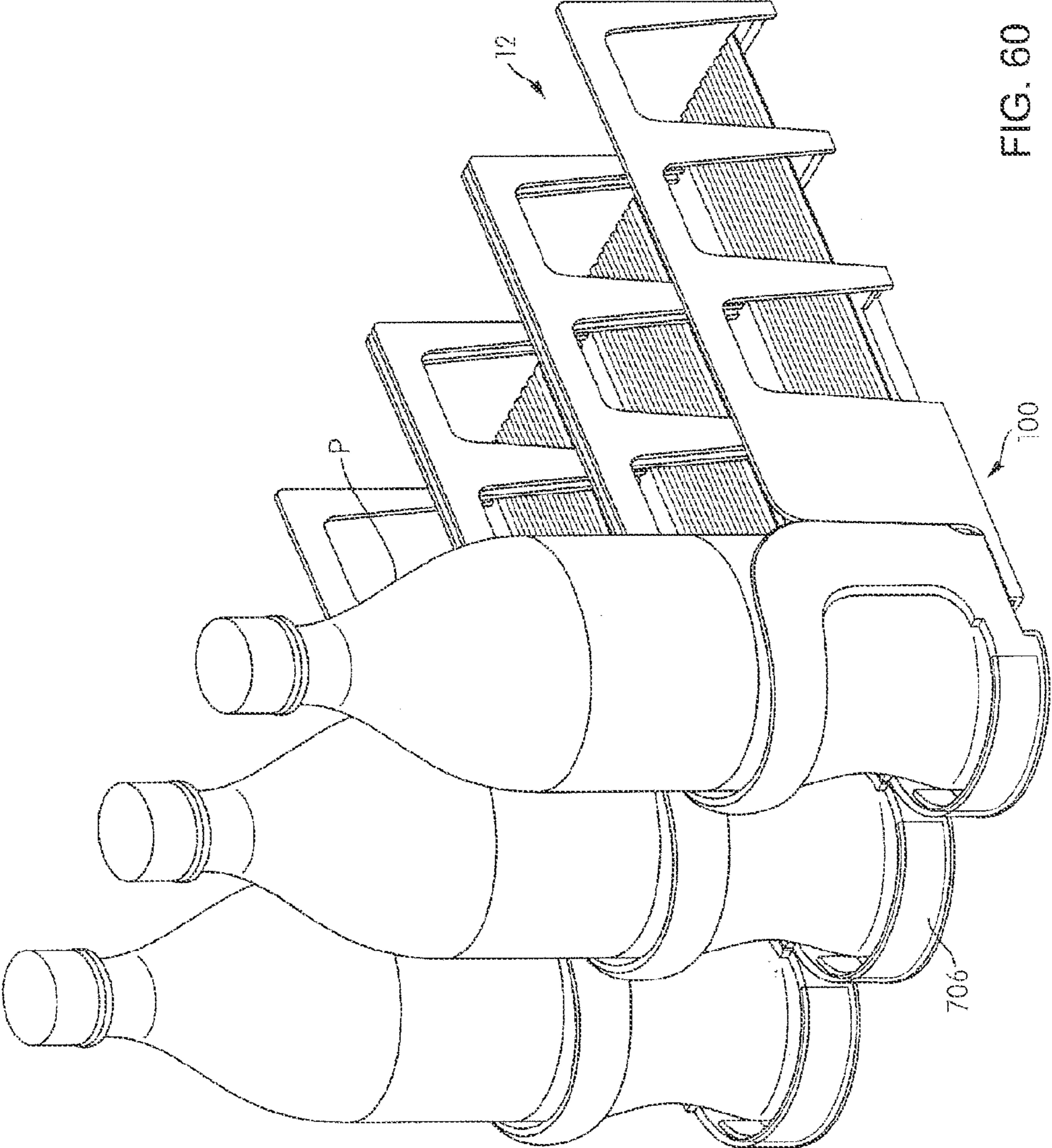


FIG. 60

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**PRODUCT MANAGEMENT DISPLAY
SYSTEM WITH TRACKLESS PUSHER
MECHANISM**

CROSS REFERENCE TO RELATED
APPLICATION

This application is a continuation-in-part of U.S. application Ser. No. 12/639,656 filed Dec. 16, 2009, which is a continuation-in-part application of U.S. application Ser. No. 12/357,860 filed Jan. 22, 2009, which is a continuation-in-part application of U.S. application Ser. No. 11/760,196 filed Jun. 8, 2007, which is a continuation-in-part application of U.S. application Ser. No. 11/411,761 filed Apr. 25, 2006, and granted as U.S. Pat. No. 7,823,734, which claims benefit to U.S. Provisional Application Nos. 60/716,362 filed Sep. 12, 2005 and 60/734,692 filed Nov. 8, 2005, all of which are incorporated herein by reference. This application also claims benefit to U.S. Provisional Application Nos. 61/530,736 filed Sep. 2, 2011, 61/542,473 filed Oct. 3, 2011, and 61/553,545 filed Oct. 31, 2011, all of which are incorporated herein by reference.

FIELD OF THE INVENTION

The exemplary embodiments of the invention relate generally to a shelf assembly for use in merchandising product and more particularly to a shelf assembly having improved mechanisms for displaying and pushing product on the shelves.

BACKGROUND OF THE INVENTION

It is known that retail and wholesale stores, such as convenience stores, drug stores, grocery stores, discount stores, and the like, require a large amount of shelving both to store product and to display the product to consumers. In displaying product, it is desirable for the product on the shelves to be situated toward the front of the shelf so that the product is visible and accessible to consumers. In the case of coolers or refrigerators that are used to store and display such products as soft drinks, energy drinks, bottled water, and other bottled or canned beverages, it is desirable for these products to also be situated toward the front of the shelf and visible and accessible to the consumers.

To accomplish this placement of product, known systems may include inclined trays or floors that through gravity will cause the product to move toward the front of the shelf. Many of these systems include floors or shelves made of a plastic material such as polypropylene that due its low coefficient of friction permit the product to easily slide along the inclined floor or surface. However, over time, these surfaces can become obstructed with debris or sticky substances that inhibit the product from properly sliding, sometimes causing several products to tip over thus blocking additional product from moving to the front of the shelf.

Other systems include the use of a pusher system to push the product toward the front of the shelf as the product at the front of the shelf is removed. The known pusher systems are typically mounted to a track and include a pusher paddle and a coiled spring to urge the product forward. Occasionally, as the system is used, and over time, the track becomes obstructed with dirt or sticky materials that hinder the proper operation of the pusher system in the track. In addition, depending on the size, shape and weight of the product to be merchandised, the known pusher paddles may occasionally tip or bend backwards, thereby causing a binding of the

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pusher mechanism in the track. In those situations, the pusher mechanism may not properly push product toward the front of the shelf.

One exemplary embodiment is directed at improving upon existing merchandising systems by providing a trackless pusher system that works with gravity-fed merchandise systems (i.e., inclined shelves or trays) and non-gravity-fed merchandise systems.

SUMMARY OF THE INVENTION

One exemplary embodiment is directed to a product management display system for merchandising product on a shelf. This embodiment includes using a trackless pusher mechanism that travels along a surface on which product is placed. The trackless system overcomes the known problems with the use of tracks to hold and guide the known pusher mechanisms. It should be understood however that the teachings of this embodiment may be used with systems that include tracks for mounting a pusher mechanism or the like.

The pusher mechanism can include a pusher paddle and a floor that extends forward of the pusher paddle. A flat coiled spring or other biasing element can be operatively connected behind the pusher paddle and extend across the floor of the pusher mechanism and to the front of the shelf. Alternatively, the flat coiled spring or biasing element can extend across the divider to the front of the shelf assembly. With this configuration, the pusher paddle is prevented from tipping or bending backwards during operation.

An exemplary embodiment also includes the use of a pushing mechanism with the merchandising of product on horizontal or non-inclined shelves or surfaces, as well as with gravity-fed systems, or systems that use gravity as a mechanism to urge product toward the front of the shelf.

In accordance with an exemplary illustrative embodiment of the invention, the pusher paddle may define a concave pushing surface for pushing cylindrical products, such as soft drink bottles or cans, and to keep the paddle centered on the track and behind the product. Alternatively, the pusher paddle may define a flat pushing surface that may further include at its upper edge a curved rib or similar structure that can also be used to push cylindrical products.

In accordance with another exemplary illustrative embodiment of the invention, the floor of the pusher mechanism can include a notched or cut-out portion to align the pusher mechanism relative to the coiled spring. Also, the floor of the system also can include a notch or cut-out portion for receiving and mounting a flat end of the coiled spring to the floor. A spring tip may be placed on the end of the coiled spring to mount the coiled spring to the floor of the system. Alternatively, the end of the coiled spring can mount to the divider of the assembly.

In accordance with yet another exemplary embodiment, an adaptor for a product management display system may be positioned on a floor surface of the display system. The adaptor may include a planar surface with at least two ribs extending outwardly from the planar surface and across the planar surface in a substantially parallel manner. A coiled spring may be positioned between the parallel extending ribs. With this configuration, product to be merchandised may sit on the ribs, and not directly on the coiled spring, to enhance the forward movement of certain types of product, such as cans of a beverage.

In yet another alternative aspect, a mounting member may be used to mount the end of the coiled spring to the floor of the system. For those systems that include spaced-apart glide

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rails that are joined together by connecting ribs, the mounting member may be snap-fit to or otherwise mounted on the floor and between the glide rails.

In yet another alternative aspect, the trackless pusher system is retrofitted into an existing shelf assembly. This allows for the placement of the trackless pusher system in an existing shelving system as a low cost alternative to purchasing the entire trackless pusher assembly.

In another exemplary embodiment, the coil spring can be mounted to the retainer. An end of the coil spring can be directly mounted to the retainer or alternatively the end can be mounted to the retainer via an adapter. The adapter can have a curved portion which is received in a correspondingly shaped curved slot in the retainer to secure the end of the spring to the display assembly.

In another exemplary embodiment, the trays can be attached via a dovetail connection to form a shelf assembly. Additionally the dividers can be adjusted such that the width of the product rows can be adapted to receive different sized products.

In accordance with yet another exemplary embodiment, the product management display system can be arranged in a stackable arrangement. The assembly can be provided with a first tray and a second tray each having a first wall and a second wall. The first and second trays are each adapted to receive a pusher mechanism, and a retainer mechanism. First and second spacers are mounted to the first and second trays for stacking the first and second trays on top of one another. The first and second spacer can be provided with a plurality of detents, and the first tray and the second tray can each be provided with a plurality of correspondingly shaped sockets for receiving the plurality of detents.

In accordance with yet another exemplary embodiment, the product management display system may include at least one tray having a front rounded portion and defining a plurality of apertures and having two sides. A lip may extend upward from the front rounded portion of the at least one tray. A front shelf may extend forward from the lip. The at least one tray may include one divider extending upwardly from each of the two sides and a front wall. The front wall may include a top wall, a bottom wall, and two side legs. The front wall, bottom wall, and two side legs may form a wall aperture and the front wall may include a plurality of projections configured to engage with the plurality of apertures on the tray.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 depicts an isometric exploded view of an exemplary embodiment of a product management display system of the present invention.

FIG. 2 depicts an isometric view of an exemplary pusher mechanism mounted to an exemplary tray or product channel of the present invention.

FIG. 3 depicts another isometric view of the system of FIG. 2 with product placed in the system.

FIG. 4 depicts another isometric view of the system of FIG. 2 with multiple products placed in the system.

FIG. 5 depicts an isometric rear view of the system of FIG. 4.

FIG. 6 depicts an alternative embodiment of the tray or product channel of the present invention.

FIG. 7 depicts an exemplary tip for an end of a coiled spring that may be used with the product management display system of the invention.

FIG. 8 depicts the exemplary tip of FIG. 7 being mounted to a surface of a tray or product channel.

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FIG. 9 depicts the exemplary tip of FIG. 7 being mounted to an end of a coiled spring.

FIG. 10 depicts the exemplary tip of FIG. 7 mounted to an end of a coiled spring.

FIG. 11 depicts an isometric view of an alternative exemplary embodiment of a product management display system of the present invention.

FIG. 12 depicts another isometric view of the system of FIG. 11.

FIG. 13 depicts a front view of the system of FIG. 11.

FIG. 14 depicts a top view of the system of FIG. 11.

FIG. 15 depicts a rear view of the system of FIG. 11.

FIG. 16 depicts an isometric view of an adaptor that may be used with the invention.

FIG. 17 depicts a front view of the adaptor of FIG. 16.

FIG. 18 depicts an exemplary installation of the adaptor of the invention.

FIG. 19 depicts an isometric view of an installed adaptor of the invention.

FIG. 20 depicts a front view of an installed adaptor of the invention.

FIG. 21 depicts an isometric view of an alternative exemplary embodiment of a product management display system of the present invention.

FIG. 22 depicts an isometric bottom view of an exemplary mounting member that may be used to mount the end of the coiled spring to the floor of the display system.

FIG. 23 depicts an isometric top view of the exemplary mounting member of FIG. 22.

FIG. 24 depicts the exemplary mounting member of FIG. 22 mounted to the end of the coiled spring with the coiled spring mounted to an exemplary pusher paddle.

FIG. 25 depicts another view of the exemplary mounting member of FIG. 22 mounted to the end of the coiled spring with the coiled spring mounted to an exemplary pusher paddle.

FIG. 26 depicts the exemplary mounting member of FIG. 22 with attached coiled spring being mounted to the floor of the system.

FIG. 27 depicts the exemplary mounting member of FIG. 22 installed on the floor of the system.

FIG. 28 depicts an isometric view of an alternative exemplary embodiment of a product management display system of the present invention.

FIG. 29 depicts a close-up isometric view of the tray of the exemplary embodiment of FIG. 28.

FIG. 29A depicts a cross-sectional view of the exemplary embodiment of FIG. 28 illustrating a first securing method.

FIG. 29B depicts a cross-sectional view of the exemplary embodiment of FIG. 28 illustrating a second securing method.

FIG. 30 depicts a close-up isometric view of the embodiment of FIG. 28 illustrating a rivet attaching the spring to the tray.

FIG. 31 depicts an isometric view of the embodiment of FIG. 28 being assembled in a preexisting wire shelf.

FIG. 32 depicts an isometric view of the embodiment of FIG. 28 assembled in a preexisting wire shelf.

FIG. 33 depicts an isometric view of an exemplary embodiment of the display system.

FIG. 34 depicts an isometric view of an exemplary embodiment of the display system.

FIG. 35 depicts an isometric view of an exemplary embodiment of an adaptor.

FIG. 36 depicts an isometric view of an exemplary embodiment of a retainer.

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FIG. 37 depicts a side view of an exemplary embodiment of the display system.

FIG. 38 depicts an isometric view of an exemplary embodiment of the display system.

FIG. 39 depicts an isometric view of an exemplary embodiment of the display system.

FIG. 40 depicts an isometric view of an exemplary embodiment of the display system.

FIG. 41A depicts a sectional side view of an exemplary embodiment of a divider.

FIG. 41B depicts a front view of an exemplary embodiment of the display system.

FIG. 41C depicts a close up view of a section of FIG. 41B.

FIG. 41D depicts a front view of an exemplary embodiment of a divider.

FIG. 42 depicts an isometric view of an exemplary embodiment of the display system.

FIG. 43 depicts an isometric view of an exemplary embodiment of the display system.

FIG. 44 depicts an isometric view of an exemplary embodiment of a product management display system.

FIG. 45 depicts another isometric view of an exemplary embodiment of a product management display system with product in the system.

FIG. 46 depicts a top view of another exemplary embodiment of a product management display system with product in the system.

FIG. 47 depicts an isometric-rear view of an exemplary embodiment of a product management display system with product in the system.

FIG. 48 depicts an isometric view of an exemplary embodiment of the pusher mechanism mounted to a divider.

FIG. 49 depicts another isometric view of the divider and pusher mechanism being assembled to the product management display system.

FIG. 50 depicts an isometric view of yet another exemplary embodiment of the product management display system.

FIG. 51 depicts another isometric view of the exemplary embodiment of the product management display system of FIG. 50 without product.

FIG. 52 depicts an exploded isometric view of the exemplary embodiment of the product management display system of FIG. 50.

FIG. 53 depicts an isometric view of yet another exemplary embodiment of the product management display system.

FIG. 54 depicts an isometric view of an exemplary attachment of the pusher spring to a shelf of the product management display system of FIG. 53.

FIG. 55 depicts an isometric view of an exemplary attachment of the pusher spring to a shelf of the product management display system of FIG. 53.

FIG. 56 depicts an isometric view of an exemplary attachment of the pusher spring to a shelf of the product management display system of FIG. 53.

FIG. 57 depicts an isometric view of an exemplary attachment of the pusher spring to a shelf of the product management display system of FIG. 53.

FIG. 58 depicts an isometric view of an exemplary embodiment of a product management display system and aspects thereof.

FIG. 59 depicts isometric views of embodiments of the product management display system of FIG. 58.

FIG. 60 depicts an isometric view of an embodiment of the product management display system of FIG. 58.

Before the embodiments of the invention are explained in detail, it is to be understood that the invention is not limited in its application to the details of construction and the arrange-

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ment of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced or being carried out in various ways. Also, it is to be understood that the phraseology and terminology used herein are for the purpose of description and should not be regarded as limiting. The use of "including" and "comprising" and variations thereof is meant to encompass the items listed thereafter and equivalents thereof as well as additional items and equivalents thereof. Further, the use of the term "mount," "mounted" or "mounting" is meant to broadly include any technique or method of mounting, attaching, joining or coupling one part to another, whether directly or indirectly.

DETAILED DESCRIPTION OF THE EMBODIMENTS

The invention may be embodied in various forms. Referring to the Figures wherein like numerals indicate like elements, there is depicted in FIG. 1 an isometric exploded view of an exemplary embodiment. Exemplary merchandise system 10 includes a product dispensing tray 12 in which is mounted an exemplary trackless pusher mechanism 14. As described in more detail below, the pusher mechanism 14 will fit in the tray 12 and will slide along the surface of the tray without the use of tracks, rails, or guides typically used to hold a conventional pusher mechanism to the tray or floor of the tray. The pusher mechanism defines a pusher paddle and a pusher floor that extends forward of the pusher paddle. A coiled spring may extend across the pusher floor and operatively connect to the tray at a forward position on the tray. In one aspect of the invention, product to be merchandised may be placed in the tray in front of the pusher paddle and may sit on the pusher floor as well as the coiled spring. With this configuration, the weight of the product will prevent the pusher paddle from tipping to ensure proper pushing of the product. In addition, the problems associated with debris or sticky materials hindering the effectiveness of known pusher systems that use tracks, rails or guides have been eliminated. Other aspects, embodiments and features of the invention and its teachings are set forth in more detail below.

The exemplary tray 12 may define a surface 16 and one or more dividing panels or dividers 18 to separate the tray into numerous rows for placement of product. In an alternative aspect, the tray 12 may be a shelf or any other surface on which products may be placed for merchandising. The surface 16 may be a solid surface or a surface defining a plurality of spaced-apart apertures 20 separated by a plurality of support ribs 22. The apertures 20 and ribs 22 provide a surface that permits the slidable movement of product placed on this surface and also permits liquids and dirt to pass through the apertures 20 so that they do not collect on the surface 16. The surface 16 may be made of any suitable material that permits the slidable movement of product on the surface 16. Other surface or floor configurations are known and may be used with the principles of the invention.

As depicted in FIGS. 9 and 10, the surface 16 may define a rounded end portion 24 that includes a notch or cut-out portion 26. The end portion 24 may be rounded to match the shape of the product that is placed on the tray. For example, the depicted end portion 24 is rounded or defines a semi-circular shape to match the contour of a bottle or can that may be placed in the tray and on the end portion 24. Other shapes of the end portion may be used with the invention depending on the product to be merchandised.

The notch 26 may be used to receive and mount an end 29 of a coiled spring 30 or similar biasing element. The notch 26

may define opposing angled edge surfaces **32** that are joined by edge **34**. The edge **34** is preferably centered across the width of the product row formed in the tray **12** and extends perpendicular to the length of the tray. This configuration will center the coiled spring **30** relative to the tray **12** and will permit the spring to extend in a substantially parallel manner relative to the length of the tray. In other words, the depicted edge **34** of the notch **26** will permit the spring **30** to extend along the length of the tray **12** at or near the center of the product row formed by the tray. One skilled in the art will appreciate that the location and configuration of the notch may vary depending on the desired placement of the spring.

The coiled spring **30** may define an end **29** that is configured to be placed across the notch **26** and onto the edge **34**. In one aspect, the end **29** of the coiled spring may be V-shaped and function as a hook such that the end **29** will wrap around the edge **34** with a portion of the end **29** of the coiled spring extending beneath the end portion **24** of the surface **16**. This configuration permits an easy installation of the coiled spring onto the tray.

In another aspect, and referring to FIG. 7, a spring tip **60** may be added to the end **29** of the spring **30** to assist with the mounting of the spring to the system. The spring tip **60** may define numerous shapes and configurations depending on the configuration of the tray and the surface on which the spring end needs to attach. The spring tip **60** may be permanently attached to the end **29** of the coiled spring **30** or it may be detachable to permit the interchange or replacement of the spring tip **60**. The spring tip **60** may be made of plastic and may define one or more apertures. Aperture **61** may be used to receive the end **29** of the coiled spring **30**. A second aperture **63** may be used to receive a mating tongue or mounting member **65** extending from the surface **16** of the tray **12**, as discussed below. With this configuration, the end **29** of the coiled spring **30** may be operatively connected to the tray **12**.

In another aspect, the end **29** of the coiled spring may snap-fit into an aperture formed in the surface **16**, or may be otherwise inserted and secured to an aperture or opening in the tray, thereby securing the end **29** of the coiled spring **30** in position.

Referring back to FIG. 1, dividers **18** may also be used to separate product into rows. The dividers **18** extend substantially upwardly from the surface **16** and as illustrated in FIG. 1, may be positioned on opposing sides of the surface **16**. Alternatively, the dividers **18** may be positioned at any desired position on the tray **12** or to the surface **16**. The dividers **18** may be formed as a unitary structure with the surface **16**, or the dividers **18** may be detachable to provide added flexibility with the system. The dividers may be attached to a front or back rail depending on the system. The dividers **18** may define numerous configurations and may extend upwardly any desired distance to provide the desired height of the dividers between the rows of product to be merchandised. This height may be adjustable by adding divider extenders or the like.

Located at the front of the tray **12** and extending between the dividers **18** may be one or more product-retaining members **44**. The product-retaining members **44** serve as a front retaining wall or bar to hold the product in the tray **12** and to prevent the product from falling out of the tray **12**. These members are also configured to permit the easy removal of the forward-most product positioned in the tray **12**. The product-retaining member **44** may be one or more curve-shaped retaining ribs as depicted in FIG. 1. These illustrated retaining ribs may extend from one divider to another divider thereby joining the dividers. The retaining ribs may also extend part-way between the dividers, as also shown in FIG. 1 as rib **46**,

to also assist in retaining the product in the tray. Alternatively, and as shown in FIG. 6 the product-retaining member **44** may be a curve-shaped solid retaining wall **48** that extends between dividers. The retaining wall **48** may be transparent or semi-transparent to permit visualization of the product on the shelf. In another aspect, the retaining wall **48** may also extend part-way between the dividers **18**. In yet another embodiment depicted in FIGS. 11-15, the retaining wall **100** may be attached to the surface of the tray and not connect to the dividers. In this embodiment, the retaining wall **100** may form an opening **102** defined by an upper member **104**, opposing, curved side walls **106** that further define an angled edge **108**, and a floor member **110**. The side walls **106** may also be straight and not curved depending on the system. The end of the coiled spring may also snap-fit into the floor **110** or otherwise attached to the tray using any of the techniques described herein. One of skill in the art will readily appreciate that there are numerous shapes and configurations possible for the product-retaining member **44** and that the depicted configurations are merely exemplary embodiments of these numerous configurations.

Referring back to FIG. 1, the exemplary trackless pusher mechanism **14** defines a pusher paddle **50** and a pusher floor **52**. The pusher paddle **50** and pusher floor **52** may be formed as a single, unitary structure or may be separate structures that are joined together using known techniques. In addition, the pusher paddle **50** and pusher floor **52** may be made of any known suitable plastic or metal material. The pusher paddle and pusher floor may be reinforced using any known reinforcing techniques.

In one aspect, the pusher paddle **50** forms a curved-shape pusher surface or face **54** that is configured to match the shape of the product to be merchandised, such as plastic bottles or cans containing a beverage, as depicted in FIGS. 3-5. The curve-shaped pusher surface **54** permits the pusher to remain centrally aligned with the last product in the tray. This configuration reduces friction and drag between the pusher and the divider walls. In an alternative aspect, the pusher surface or face may be a flat surface. In yet another aspect, the flat pusher surface may be accompanied by a curved shaped rib that is positioned near or on the top of the pusher paddle and that may be used to center and align product in the tray, in a manner similar to the curve-shaped pusher surface **54** depicted in FIG. 1. The curve shaped rib may define other shapes and configurations that permit cylindrical or similar shaped products to be properly pushed in the tray. Advertisement, product identification or other product information may be placed on the pusher surface **54**.

Positioned behind the pusher surface or face **54** may be one or more support members **58**, such as ribs, walls, or gussets. The support members **58** are configured to support the pusher surface **54** and further connect the pusher paddle **50** to the pusher floor **52**. As can be seen in FIG. 5, positioned between the support members **58** is the coiled spring **30**, and more specifically the coiled end **57** that is used to urge the pusher paddle **50** forward and along the tray **12**, as understood in the art. Any technique used to operatively connect the coiled spring to the pusher paddle **50** may be used with the invention.

As shown in FIG. 1, the pusher floor **52** may be positioned below the pusher paddle **50** and may extend forward of the pusher surface **54** of the pusher paddle. The pusher floor **52** may extend any predetermined distance and at any predetermined angle. For example, the pusher floor **52** may extend substantially perpendicular to the pusher surface **54**. In the exemplary embodiment, the pusher floor **52** may extend a sufficient distance to permit one product, such as a single bottle or can, to be placed on the pusher floor. In another

aspect, the pusher floor **52** may be configured to permit more than one product to be placed on the pusher floor. The pusher floor **52** may define any shape, including the depicted round shape and may define any product retaining features on the surface of the pusher floor, such as ribs, walls, or the like, to further hold the product on the pusher floor.

As can be seen in FIG. 2, the pusher floor **52** may define an elongated channel, groove or recessed portion **59** that is sized, shaped and configured to seat the coiled spring **30**. In the exemplary embodiment, the channel or groove **59** may extend across the floor **52** and in a substantially perpendicular manner relative to the pusher paddle **50**. In an alternative aspect, the groove or channel may extend part-way or across the entire pusher floor **52**, as shown in FIG. 19. Such configuration permits the proper alignment and positioning of the pusher paddle **50** in the tray. The groove **59** may define a depth that matches or exceeds the thickness of the coiled spring **30**. With this configuration, the coiled spring **30** will seat at or below the pusher floor surface such that product will not sit directly on the coiled spring, rather, such product will sit on the pusher floor surface. As shown in FIG. 19, the pusher floor may include apertures and openings through which debris or other items may pass. Alternatively, the floor may be a solid surface.

In an alternative aspect of the invention, as shown in FIGS. 16-20, an adaptor **180** may be positioned on the surface **16**. Referring to FIGS. 16 and 17, the adaptor **180** may include one or more raised ribs **182** on which a product may sit. The raised ribs **182** may extend longitudinally along the length of the adaptor **180**. The adaptor **180** may be a flat extrusion of plastic material (or any other suitable material) defining a planar surface **184** with the one or more ribs **182** extending outwardly from the planar surface **184**. The adaptor **180** may define a rounded end **185** and include a notch or cut-away portion **186** through which or across which the coiled spring may extend. The rounded end **185** may be configured to match the shape of the product that is placed on the tray. Other shapes of the end **185**, notch **186** and adaptor **180** may be used with the invention depending on the product to be merchandised. The adaptor **180** may be a separate, insertable piece or, alternatively, a piece formed integral with the surface **16**.

Referring to FIG. 18, the adaptor **180** may be easily insertable onto the surface **16** and between the dividers **18**. Referring to FIG. 19, once the adaptor **180** is installed, the pusher mechanism **14** may be positioned on top of the adaptor **180** and may slide freely across the ribs **182** of the adaptor **180**. The coiled spring **30** may extend in a parallel manner between the ribs **182** and may seat at or below the top surface of the ribs **182**, as more clearly shown in FIG. 20. With this configuration, the product to be merchandised may sit on, and slide along, the ribs **182** and not on the coiled spring **30**.

In an alternative aspect, the ribs **182** may be a raised bead or raised beads, or a series of fingers that may be used to facilitate the movement of the product on the surface **16**. In yet another alternative embodiment, the ribs **182** may be product moving members, such as runners or one or more rollers or rolling members that permit the product to roll across the rolling members and toward the front of the product display system. Exemplary roller assemblies include those disclosed and described in U.S. application Ser. No. 11/257,718 filed Oct. 25, 2005 and assigned to RTC Industries, Inc., which application is incorporated herein by reference. As should be appreciated by those skilled in the art, there are many possible techniques that may be used with the described pusher mechanisms for facilitating the movement of the product on the shelf or floor.

The underneath side of the pusher floor **52** may be a smooth planar surface that will slide freely along the surface **16**. Alternatively, and similar to above, the pusher floor **52** may include beads, runners, rollers or the like that will permit the pusher floor to slide along the surface yet raise the pusher floor up off of the surface **16**. In another alternative embodiment, the underneath side of the pusher floor may be configured with rail mounting members to permit the mounting of the pusher to a track or rail, as understood in the art.

The pusher floor further defines a notch or cut-out portion **62** through which will pass the coiled spring **30**. The end **29** of the coiled spring **30** will pass through the notch **62** and through the notch **26** of the surface **16** and will mount to the tray using any of the techniques described above.

In use, as the pusher mechanism **14** is urged rearward in the tray **12**, the end **29** of the coiled spring **30** will be held in position as described above and the coiled end **57** of the spring **30** will begin to uncoil behind the pusher paddle **50**. If the pusher **14** is allowed to move forward in the tray **14**, such as when product is removed from the front of the tray, the coiled end **57** of the spring **30** will coil and force the pusher paddle **50** forward in the tray **12**, thereby urging product toward the front of the tray.

In an alternative embodiment, the coiled spring **30** may extend below and underneath the pusher floor **52** as opposed to above and across the pusher floor, as depicted in the figures. With this configuration, the groove **59** and notch **62** may not be necessary.

The coiled spring **30** may be any biasing element including, without limitation, a flat coil spring commonly used with pusher systems. The present invention may use one or more coiled springs to urge the pusher mechanism **14** forward depending on the desired application. The coil tension of the spring **30** may also vary depending on the particular application.

Referring to FIG. 2, the trackless pusher mechanism **14** is shown mounted to the tray **12**. As illustrated, the pusher mechanism **14** fits in the tray **12** between the dividers **18**. End **29** of the coiled spring **30** extends through the notch in the pusher floor and mounts to the tray as described above. In use, the pusher mechanism **14** will slide along the surface **16** of the tray **12** without the use of tracks, rails, or guides. As depicted in FIG. 2, the pusher mechanism **14** is shown in a forward position.

Referring to FIG. 3, the pusher mechanism **14** is shown merchandising one product **70** in the merchandise system **10**. The product is prevented from tipping out of the tray by the product-retaining member **44**. The product **70** may be any product to be merchandised including the depicted soft drink bottle. As shown in this Figure, the product **70** sits on the pusher floor **52** and the coiled spring **30** that extends below the product. The weight of the product on the floor **52** and the positioning of the product across the spring **30** prevent the paddle **50** from tipping in the tray **12**.

Referring to FIG. 4, the pusher mechanism **14** is shown merchandising multiple products **70** in the merchandise system **10**. As shown in this Figure, the product next to the pusher paddle **50** sits on the pusher floor **52** and the coiled spring **30** that extends below the product. The other products will sit on the coiled spring **30** that will extend below these products. Alternatively, the adaptor **180** may be positioned in the system in which case the product may sit on the ribs **182** of the adaptor as opposed to the coiled spring. Again, the weight of the product on the pusher floor **52** and the positioning of the products across the spring **30** prevent the paddle **50** from tipping in the tray. In use, as one product is removed from the front of the tray near the product-retaining member **44**, the

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pusher mechanism 14 (through the urging of the coiled spring 30) will push the remaining product forward in the tray 12 until the forward-most product contacts the product-retaining member 44. As additional products are removed, the pusher mechanism 14 will continue to push the remaining product toward the product-retaining member 44.

Referring to FIG. 5, a rear view of the pusher mechanism 14 shows the pusher mechanism 14 merchandising multiple products 70 in the merchandise system 10. Again, the product next to the pusher paddle 50 sits on the pusher floor 52 and the coiled spring 30 that extends below the product. The other products will sit on the coiled spring that will extend below these products. Alternatively, the adaptor 180 may be positioned in the system in which case the product may sit on the ribs 182 of the adaptor as opposed to the coiled spring. As one product is removed from the front of the tray near the product-retaining member 44, the coiled end 57 of the spring 30 will urge the pusher paddle 50 of the pusher mechanism 14 forward in the tray 12 until the forward-most product contacts the product-retaining member 44. As can be seen in this Figure, the coiled end 57 may be positioned between two support members 58. The support members will retain the coiled spring between these members. As can be seen in this Figure, the pusher floor 52 may also extend below the support members 58.

Referring to FIG. 6, an alternative embodiment of the pusher tray is depicted. With this embodiment, multiple trays 12 may be formed into a single multi-tray assembly 80. The multi-trays may have a common floor with dividers 18 extending upwardly from the floor to create the multiple trays or rows. In this embodiment, the product-retaining member 44 may be a solid member that extends between two dividers, as discussed above. One or more of the multi-tray assemblies 80 may be coupled or joined together in a side-by-side manner using any known technique, including clips, dovetailing, fasteners, or the like. With this configuration, numerous rows of product can be provided for the merchandising of numerous products.

As stated above, the trackless pusher mechanism 14 may be used with gravity-fed systems, that is, systems having trays or product channels that are mounted on an incline to permit gravity to assist with the merchandising of the product. Alternatively, the trackless pusher mechanism 14 may be used with systems that are mounted in a non-inclined or in a horizontal manner where gravity will provide little or no assistance with the merchandising of the product. The trackless pusher mechanism 14 may also be used to push various shaped products.

FIG. 7 depicts an exemplary tip 60 for the end 29 of a coiled spring 30 that may be used with the merchandise system 10. As illustrated, the tip 60 defines an aperture 61 for receiving the end 29 of the coiled spring and an aperture 63 for mounting to the surface 16 of the tray. As can be seen in FIG. 7, in one aspect of an alternative embodiment, extending beneath the surface 16 may be a tongue or mounting member 65 that may be configured to mate with the aperture 63 and to snap-fit the tip 60 onto the tongue 65 and thus to the surface 16.

Referring to FIG. 8, the exemplary tip 60 of FIG. 7 is shown being mounted to the tongue or mounting member 65. The tongue 65 may include an elongated outwardly extending rib 67 that is used to snap-fit the tip 60 onto the tongue 65. One skilled in the art will appreciate that other techniques may be used to mount the tip 60 to the surface 16 and that the depicted technique is merely an exemplary embodiment of one such technique.

Referring to FIG. 9, the exemplary tip 60 is shown fully mounted in a snap-fit manner to the surface 16, and more

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specifically to the end portion 24 of the surface 16 of the tray 12. Also depicted is the mounting of the end 29 of the coiled spring 30 to the aperture 61 of the tip 60. As shown in FIG. 9, the end 29 of the coiled spring may be inserted into the aperture 61. The aperture 61 is configured to receive the end 29 of the coiled spring and hold the end 29 in position, and to also permit the removal of the end 29 of the coiled spring from the aperture 61 in those circumstances where it is desirable to disconnect the coiled spring from the tip to permit the removal of the pusher mechanism 14 from the system.

Referring to FIG. 10 there is shown the end 29 of the coiled spring fully mounted to the exemplary tip 60. As illustrated in this figure, the coiled spring 30 is now operatively connected to the surface 16 of the tray 12. As a result, the pusher mechanism 14 is now mounted to the tray 12.

Referring to FIGS. 21-27 there is shown an alternative technique for mounting the end 29 of the coiled spring 30 to the merchandise display system. A mounting member 130 may be used to mount the end 29 of the coiled spring to the floor 131 of the system. For those systems that include spaced-apart glide rails 132 that are joined together by connecting ribs 134 (FIGS. 26-27), the mounting member 130 may be snap-fit to or otherwise mounted on the floor 131 and between the glide rails 132. The mounting member will thus hold the end of the coiled spring in position and to the floor of the system.

Referring to FIGS. 22-23, the mounting member 130 may include one or more legs 136 on one or more sides of the member 130. The legs may be configured to snap-fit to the underside of the rails 132 to thereby hold the mounting member 130 to the floor of the system. The legs 136 may include legs ends 137 defining an L-shape or angled surfaces that are configured to contact the underside of the rail 132 and prevent the mounting member 130 from being lifted up from the floor, except by the intentional flexing of the legs out from the underside of the rail 132. The legs 136 may contact the connecting ribs 134 which will prevent slidable movement of the mounting member 130 relative to the floor. Referring to FIG. 26, the mounting member 130 is shown being mounted to the floor of the system and more specifically to the rails. FIG. 27 illustrates that the mounting member 130 remains in position as the pusher paddle 141 is pulled away from the front of the system. The mounting member 130 may be connected to this type of system floor 131 using other techniques. For example, a separate mounting clip, one or more fasteners, adhesives, or other techniques may be used to secure the mounting member 130 to the floor 131.

Referring to FIGS. 22-23, the mounting member 130 may also include an aperture or opening or slot 138 that will receive the end 29 of the spring. The spring may be mounted using any of the techniques described herein, or other techniques. The configuration of the aperture 138 and mounting member 130 will hold the spring in position on the mounting member 130, similar to the technique described above.

The mounting member 130 may also include glide ribs 139 on a top surface that allow product placed thereon to slide more easily across the mounting member after the mounting member is installed to the floor of the system. The mounting member 130 may also include an elongated flat body 140 that extends forward of the location of the legs 136 to provide stability to the mounting member 130 after it is mounted to the floor of the system.

Referring to FIGS. 24-25 and 27, the pusher paddle or pusher mechanism 141 may include a pusher face 143 configured to match the shape of the product against which it pushes. As illustrated, the pusher face 143 may be curve shaped to match the shape of a bottle or other cylindrical

object. The pusher paddle **141** may also include a pusher floor **145** similar to the pusher floor configurations described above. The pusher floor **145** may further include a spring sleeve **147** that receives the coiled spring **30** to shield and protect the spring. The spring sleeve **147** may extend partly or fully across the pusher floor **145** and in the direction of the spring **30**. The spring sleeve **147** may have a relatively short height and a flat surface **149** to permit product to sit thereon without significant tipping or leaning of the product.

The pusher paddle **141** may be positioned on top of the floor **131** to glide on top of the surface, as described above. The pusher paddle may be positioned between two product divider walls **153** that are joined together by a product retaining member **155**. Additional product retaining members **157** may extend outwardly from the product dividers.

Referring to FIGS. **28** and **29** there is shown yet another alternative technique for mounting the end **29** of the coiled spring **30** to the merchandise display system. In this embodiment, the end **29** is riveted to the tray **216**.

Referring to FIGS. **28-32** in an alternative embodiment, the trackless pusher system may be retrofitted to an existing shelf assembly **230**, which may have product dividers already built in. For example, in one embodiment, the trackless pusher system may be retrofitted to an existing wire shelf assembly. Referring to FIGS. **30-32**, a tray or adaptor **216** may have a glide floor **222** that may be sized to a single lane of the shelf **234** or sized to an entire shelf width. The glide floor **222** may include several raised ribs **224**, which help to reduce friction for the products merchandised on the tray **216**. It should be understood that one or more raised ribs **224** may be used with the glide floor **222**. Alternatively, the glide floor **222** may be a flat, planar surface without raised ribs. The tray or adaptor **216** may be configured similar to the adaptor **180** of FIG. **16**.

As shown in FIGS. **28** and **30**, the end **29** of coiled spring **30** may be riveted, via a rivet **229**, to the front end **228** of the tray **216**, or may be attached by any other attachment technique. The tray **216** can be retained to the shelf by any attachment technique suitable for the particular shelf. In one embodiment, and as illustrated in FIGS. **29-32**, the tray **216** may include one or more outwardly extending fingers or snaps **220**, which may engage one or more individual wires **232** of the shelf **234** to retain the tray **216** on the shelf **234**. The fingers or snaps **220** may extend longitudinally along the length of the tray **216**, or may be spaced apart along the length of the tray. The snaps **220** may be used to snap-fit the tray **216** to the existing wire shelf. As depicted in FIGS. **29A** and **29B**, the snaps **220A** and **220B** may define numerous configurations that permit the tray **216** to be snap fit to the shelf. The embodiment depicted in FIGS. **28-32** allows for the placement of the trackless pusher system in an existing shelving system, such as a wire shelf system, as a low cost alternative to the entire trackless pusher assembly. It should be understood that with this embodiment, any pusher mechanism described herein may be used.

As depicted in FIGS. **33** and **44**, in another exemplary embodiment, the display management system comprises one or more pusher mechanisms **286**, one or more dividers **266**, one or more trays **306**, and one or more retainers **250**. The pusher mechanisms **286** can be formed of a pusher paddle **287** and a pusher floor **288**. Product is placed on the pusher floor **288** and guided to the front of the display management system via the dividers **266** and the pusher paddle **287**. The coiled spring **30** biases the pusher mechanism **286** toward the retainer **250** such that product moves to the front of the system.

In one exemplary embodiment, depicted in FIG. **33**, the coiled spring **30** can be mounted to the retainer **250**. Alternatively,

the coiled spring **30** can be mounted to a divider **266** (also shown in FIGS. **48** and **49**). The coiled spring **30** can be directly mounted to the retainer **250**, as depicted in FIG. **33**, or can be mounted to the retainer **250** via a separate adapter **252**, as depicted in FIG. **34**.

As depicted in FIG. **35**, the adapter **252** has a wall **254** proximate a first end **256**. The first end **256** has a curved portion **262**, which curves upwardly. The middle portion of the adapter **252** may be provided with a curved slot **260**, which is adapted to receive a correspondingly shaped spring end (not shown).

The coiled spring **30** at one end can be secured to the middle portion of the adapter **252**. In an exemplary embodiment, the curved slot **260** corresponds in shape and size of the first spring end. Additionally, the first spring end of the coiled spring **30** can be crimped or bent to provide for additional fastening. Nevertheless, any sufficient fastening method can be used to fix the first spring end of the coiled spring **30** to the adapter **252**.

In an exemplary embodiment, shown in FIGS. **36** and **37**, the retainer **250** has a curved slot **284** corresponding in shape and size to the curved portion **262** of the adapter **252**. The curved slot **284** extends the length of the retainer to allow for unlimited positioning of the adapter **252** along the length of the retainer **250**.

To secure the first spring end of the coiled spring **30** to the retainer **250**, the curved portion **262** of the adapter **252** is placed into the curved slot **284** of the retainer **250**. The curved slot **284** secures the adapter **252** and the first spring end of the coiled spring **30** to the retainer **250** and provides for a quick and easy assembly of the display system. The wall **254** provides additional stability in the connection between the retainer **250** and the adapter **252**. Other methods, however, can be used to secure the adapter **252** and/or the first spring end of the coiled spring **30** to the retainer **250**.

Alternatively, as depicted in FIGS. **33** and **44** the coiled spring **30** of the pusher paddle **287** can be mounted directly to the front of the tray **306**. The first spring end **290** of the coiled spring **30** is provided with a curved portion. The curved portion curves downwardly from the pusher floor **288** and is adapted to be received in a recess **316** (shown in FIG. **33**) defined by a lip **318** of the front surface of the dispensing tray **306** and the retainer **250**. A vertically oriented surface of the retainer **250** and the lip **318** are spaced such that a gap is formed between the vertically oriented surface and a front edge of the lip **250**. To secure the coiled spring **30** and the pusher mechanism **286** to the assembly, the first spring end **290** is inserted into the gap formed between the vertically oriented surface of the retainer **250** and the front edge of the lip **318** and placed into the recess **316** formed by the lip **318** of the dispensing tray **306** and the retainer **250**.

In another exemplary embodiment depicted in FIGS. **38**, **39**, **48** and **49**, the coiled spring **30** can be directly mounted to a divider **266**. In addition, in this exemplary embodiment the coiled spring **30** can be mounted perpendicular to the pusher floor **288** such that the axis, about which the coiled spring **30** is coiled, is perpendicular to the pusher floor **288**. This orientation has the benefit of preventing the pusher paddle from tipping back. The first spring end **290** can be provided with an angled portion **292** and a tip portion **296**. In one exemplary embodiment, the angled portion **292** can be bent perpendicular to the coiled spring body **294**. The divider can be provided with a slot **298**, which is adapted to receive the tip portion **296** of the first spring end **290**.

To secure the coiled spring to the divider, the tip portion **296** is inserted into the slot **298**. Once the tip portion **296** is

fully inserted into the slot 298, the angled portion 292 engages the slot 298 so as to secure the first spring end 290 to the divider 266.

As depicted in FIG. 33, various pusher mechanism designs can be implemented. The pusher paddle 287 can be formed flat to accommodate correspondingly shaped product. Alternatively, the pusher paddle 286 can have a curved first end and a flat second end. This serves to accommodate a variety of cylindrical products having a variety of different sized diameters and to facilitate the operation of the pusher mechanism 286. During operation, the product in the pusher mechanism 286 and the curved first end together force the pusher mechanism against the divider 266, such that the coil spring 30 remains flat against the divider 266 holding the first spring end 290, while in tension or in operation. This allows for a smoother operation of the pusher mechanism and ensures that the product is properly dispensed as users remove the product from the system.

In another exemplary embodiment depicted in FIGS. 40-41D, the distance between the dividers 266 can be adjusted to accommodate different sized containers. The dividers 266 can be provided with connecting portions 272. The connecting portions 272 can be provided with a first elongated angled surface 268 and a second elongated angled surface 270. Additionally, the connecting portions 272 can be provided with a plurality of projections 274. As depicted in FIG. 41B, the rails can be formed of teeth 278 having face surfaces 280 and flank surfaces 282.

When assembled, as depicted in FIG. 41C, the connecting portions 272 are received between the teeth 278 of the rails. Additionally, the elongated angled surfaces 268 and 270 and the projections 274 are wedged between the teeth 278. Also as shown in FIG. 41C, the elongated angled surfaces 268 and 270 engage the face surfaces 280, and the projections 274 engage the lower surfaces of the teeth 278. Flank surfaces 282 contact the connecting portion 272.

In an exemplary embodiment depicted in FIG. 42, the trays 306 are provided with dovetail connections. A first side 308 of the trays 306 is provided with tongues 312 adapted to fit within grooves 314 located on a second side 310 of the trays 306. To connect the trays, the grooves 314 are aligned with tongues 312 such that the tongues 312 are firmly secured within the grooves 314.

In an exemplary embodiment depicted in FIG. 43, the trays 306 are configured to receive the retainer 250 at a front end. The retainer can be provided with rectangular holes 300, and the retainer is provided with correspondingly shaped and sized projections 302. To secure the retainer 250 to the tray 306, the projections 302 fit into holes 300 to lock the retainer into place on the tray 306.

As depicted in FIGS. 45-47, after the product management display system is assembled, product is loaded into the system. By adjusting the dividers 266 a wide variety of product sizes and shapes can be loaded into the system. As shown in FIGS. 46 and 47, the coil spring 30 in conjunction with the pusher paddle 287 push the product toward the retainer 250. As a user takes product out of the system, the pusher paddle 287 pushes the remaining product such that the product slides along the floor 264 to the retainer 250. This assures that all product remains at the front of the display system.

As depicted in FIGS. 50-52, the product management display system 400 can be arranged such that trays 402, 404 can be stacked on top of one another. This embodiment can consist generally of a first tray 402, a second tray 404, a first spacer 406, and a second spacer 408.

The trays 402, 404 are each arranged to house product to be dispensed. The first tray 402 and the second tray 404 can be

each provided with a clear retainer 410, a pusher mechanism 412, first and second guiding walls, and a coil spring 414.

The pusher mechanism 414 is arranged in a similar fashion as the embodiments discussed above, such that it slides product along the surface of the trays 402, 404, while product is removed. Additionally, any of the alternative arrangements of the pusher mechanism discussed above may be implemented in a stackable tray arrangement.

To provide for an easy assembly and disassembly, the stackable product management display system can be provided with a dovetail connection or any other suitable connection, such as a snap-fit connection, screw-thread connection, or a rivet connection. The first and second trays are provided with detents 416 for assembling the first and second spacers 406, 408 to the first and second trays 402, 404. Each of the first and second trays 402, 404 can be provided with sockets 418 on their respective outside surfaces for receiving the correspondingly shaped detents 416 located on the first and second spacers 406, 408.

To assemble the stackable product management display system, the detents 416 located on the first and second spacers 406, 408 are placed into the correspondingly shaped sockets 418 on the outside surfaces of the first and second trays 402, 404 in a locking arrangement. This provides for a stackable arrangement that can be implemented in conjunction with any of the embodiments discussed above.

In another exemplary embodiment depicted in FIGS. 53-57, a pusher paddle 500 may be mounted directly to a shelf 508 and held to the shelf by the end of the coiled spring 504. The pusher paddle 500 will slide along and on top of the surface of the shelf. One or more dividers 502 that define a T-shaped configuration may be positioned next to the pusher paddle 500. In an alternative aspect, the base of the divider 502 may be positioned on the shelf such that the base is located underneath the pusher paddle 500. With this configuration, the pusher paddle 500 may slide along the base of the divider. If the dividers 502 are positioned sufficiently far away from the paddle 500, the paddle 500 will slide directly on the surface of the shelf 508. The dividers 502 may define numerous configurations including those described herein and may be secured to the shelf using any known technique, including push pins, rivets, fasteners, adhesives and the like.

In one aspect, the end 510 of the coiled spring 504 is positioned within a hole or aperture 506 located on the shelf 508. The end 510 may define a spring tip that may further define any suitable configuration that permits the spring end to pass into the hole 506 and remain secured to the hole. For example, the spring tip of end 510 may define a hook-shaped configuration that permits the end 510 to wrap around the edges of the hole 506. Alternatively, the spring tip may define one or more catches that hook onto the edges of the hole 506. Still other spring tip configurations are possible.

As shown in FIG. 54, to further secure the spring 504 to the shelf 508, a fastener 512, pin, rivet or the like may be used. This fastener 512 will provide a second spaced-apart anchoring point for the spring that will hold the spring in the desired alignment during the full operation of the spring 504 as the paddle 500 moves back and forth on the shelf 508. It will be appreciated that depending on the shelf type and the number and spacing of existing holes on the shelf, even more anchoring points are possible.

Referring to FIGS. 55-57, there is depicted an exemplary mounting technique for mounting the spring 504 of the paddle 500 onto a shelf. As shown in FIG. 55, the end 510 of the spring 504 is inserted into the hole 506 on the shelf. The end 510 may define a spring tip as described herein to hold the end 510 to the edges of the hole 506. As shown in FIG. 56, the

spring 504, which in this embodiment includes a rivet or stud 514, is lowered onto the shelf such that the rivet or stud 514 fits within another hole 506 located on the shelf. This rivet or stud provides another anchoring point for the spring. As shown in FIGS. 56 and 57, the spring 504 may define an aperture 516 for receiving yet another rivet or stud 518 to even further secure the spring 504 to the shelf. With these multiple anchoring points, the spring 504 will be secured to the shelf, and thus the paddle will be secured to the shelf. Also, with these multiple anchoring points, the spring will retain the desired alignment during the full operation of the spring as the paddle moves back and forth on the shelf. It should be understood that other anchoring techniques are possible to secure the end of the spring 504 to the shelf, including any of the technique described herein, or any combination of the techniques described herein. It should be appreciated that if a shelf does not have pre-existing holes that could be used to anchor the spring 504, one or more holes could be drilled into the shelf at the desired locations.

With the embodiment depicted in FIG. 53-57, it can be appreciated that a trackless pusher paddle may be retrofitted directly onto existing store shelves with very minimal effort or extra mounting pieces. Additionally, this embodiment is easily removable to permit the repositioning of the pusher paddle at any location on the shelf to accommodate any size and type of product being merchandised on the shelf. One of skill in the art will also appreciate that any of the pusher paddles described herein may be mounted directly to the shelf using the techniques described herein, or by using any combination of the techniques described herein.

In another embodiment, depicted in FIGS. 58-60, a tray 12 includes a front rounded portion 669. As illustrated in FIG. 58, the tray 12 also includes a forward lip 670 that is located adjacent the front of the front rounded portion 669. The forward lip 670 can be rounded and can extend perpendicularly in an upward direction from the tray 12. The forward lip can have different heights and in an embodiment has a height of 0.5 inches from the tray 12. The forward lip includes a raised edge or wall portion 671 at each lateral end of the forward lip. The wall portions serve to close off the side portions of the caption pocket that is described later.

The tray also can include a shelf 672 that is located immediately adjacent and in a frontward direction of the forward lip 670. The shelf 672 can be curved and can match the curvature of the forward lip 670. The shelf 672 includes a horizontal surface 674. The shelf 672 also includes protrusions 676 that are perpendicular to the horizontal surface 674 of the shelf 672. The shelf 672 and the forward lip 670 add strength to the front portion of the pusher tray. In addition, the horizontal surface 674 of the shelf 672 serves to close off the bottom portion of the caption pocket that is described later.

In an embodiment, a front wall 100 includes a top wall 680 and a bottom wall 682. The top wall and the bottom wall are connected by two side legs 684. The top wall 680 and the bottom wall 682 are curved. An aperture 686 is defined by the top wall 680, bottom wall 682 and side legs 684. This aperture can be sized such that a product P will not fit through the aperture. The top wall also can contain a contour from the top 688 of the top wall to the bottom 690 of the top wall. This contour assists in limiting or preventing scratches to the top wall. The contour also increases the strength of the top wall. The bottom wall includes a side wall 708 that in operation is adjacent to and may be in contact with protrusion 676. The side legs include notches 698 at the bottom portion of the side legs 684. The notches assist in allowing the hooks 694 to be inserted into apertures 696. The front wall can be constructed

of clear material which will not obstruct the view of product P being merchandised in trays 12.

A graphic pocket 692 is defined by (a) the bottom wall 682 of the front wall 100, (b) the curved portion of lip 670, (c) wall portions 671 at the lateral ends of lip 670 and (d) the horizontal surface 674 of shelf 672. This graphic pocket is sized to contain a graphic strip or other advertising. Once the graphic strip is placed in the pocket 692, it is protected from all sides other than the top.

The front wall further comprises two hooks 694. These hooks are configured to fit within with apertures 696 of tray 12. In an embodiment, to fit the hooks 694 within the apertures 696 the front wall first is rotated in the direction of the arrow "A" as depicted in FIG. 101 with the hooks 694 not in engagement with the apertures 696. The hooks 694 are then initially inserted into the apertures 696 while the hooks 694 are at an angle to the apertures. The front wall is then rotated in the direction of the arrow "B" until the front wall comes to the position shown in FIG. 102-B. In this position, upper portions 696 of the hooks 694 are parallel to the underside of the surface 16 of tray shelf 12 and the hooks 694 are fully inserted through the apertures 696. The hooks 694 are thereby mounted to the tray 12. In an embodiment, the rear edge 700 of side legs 684 is adjacent to the front edge 702 of the divider 18. The rear edge 700 of side legs 684 may be in contact with the front edge 702 of divider 18.

FIGS. 59A-C disclose different mounting states of the front wall 100 and a graphic caption 706. FIG. 59A discloses the front wall 100 not mounted with the tray 12. Instead, front wall 100 is shown elevated above tray 12. Graphic caption 706 also is shown in an unmounted state. FIG. 59B discloses front wall 100 mounted with tray 12. In FIG. 59B graphic caption 706 is unmounted. The downward arrows in FIG. 59B show the direction graphic caption 706 will move in to mount with the graphic pocket 692. FIG. 59C discloses the graphic caption 706 mounted in graphic pocket 692. When several trays 12 are connected to each other, the graphics caption 706 can form a continuous or near-continuous strip of graphics advertising. Trays 12 can be formed individually and connected together, such as through dovetail connections. In an embodiment, multiple trays can be formed as a unit to create a single unit for merchandising numerous rows of products.

FIG. 60 discloses several front walls 100 mounted with several trays 12. The near-continuous nature of the graphics advertising from the graphics caption 706 is seen in FIG. 60. In addition, FIG. 60 discloses product P being maintained on trays 12 and constrained by front walls 100.

Variations and modifications of the foregoing are within the scope of the present invention. For example, one of skill in the art will understand that multiples of the described components may be used in stores and in various configurations. The present invention is therefore not to be limited to a single system, nor the upright pusher configuration, depicted in the Figures, as the system is simply illustrative of the features, teachings and principles of the invention. It should further be understood that the invention disclosed and defined herein extends to all alternative combinations of two or more of the individual features mentioned or evident from the text and/or drawings. All of these different combinations constitute various alternative aspects of the present invention. The embodiments described herein explain the best modes known for practicing the invention and will enable others skilled in the art to utilize the invention.

What is claimed is:

1. A product management display system comprising: a tray having a front rounded portion and a surface defining a plurality of apertures;

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a lip extending upward from the front rounded portion of the tray;

a front shelf extending forward from the lip;

a front wall having a top wall portion, a bottom wall portion, and two side leg portions, wherein the front wall portion, bottom wall portion, and two side leg portions form a wall aperture, wherein the front wall includes a plurality of projections configured to engage with the plurality of apertures on the surface of the tray; and

a pusher mechanism configured to slide across at least a portion of the surface of the tray, the pusher mechanism mounted to and held onto the tray by a coiled spring.

2. The product management display system of claim 1, further comprising:

two wall portions, each of the two wall portions extending from an opposite end of the lip,

wherein a graphic pocket is formed by the bottom wall portion, the lip, and the two wall portions.

3. The product management display system of claim 2, wherein the graphic pocket houses a graphic strip.

4. The product management display system of claim 1, wherein the front wall is curved.

5. The product management display system of claim 1, wherein the front wall portion and the bottom wall portion prevent a product placed on the surface of the tray from fitting through the wall aperture.

6. The product management display system of claim 1, wherein the front wall is removable from the tray.

7. A product management display system comprising:

a tray having a front rounded portion and a surface defining a plurality of apertures;

a lip extending upward from the front rounded portion of the tray;

a front shelf extending forward from the lip;

a front wall having a top wall portion, a bottom wall portion, and two side leg portions, wherein the front wall portion, bottom wall portion, and two side leg portions form a wall aperture, wherein the front wall includes a plurality of projections configured to engage with the plurality of apertures on the surface of the tray; and

a plurality of dividers attached to the tray, the plurality of dividers configured to separate product into one or more rows;

wherein an edge of the each of the side leg portions abut an edge of one of the plurality of dividers.

8. The product management display system of claim 1, wherein the front wall is translucent.

9. A product management display system comprising:

a tray having a front rounded portion and a surface defining a plurality of apertures;

a lip extending upward from the front rounded portion of the tray;

a front shelf extending forward from the lip;

a pusher mechanism configured to slide across at least a portion of the surface of the tray, the pusher mechanism mounted to and held onto the tray by a coiled spring;

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a removable front wall having a top wall portion, a bottom wall portion, and two side leg portions, wherein the front wall portion, bottom wall portion, and two side leg portions form a wall aperture; and

two wall portions, each of the two wall portions extending from an opposite end of the lip;

wherein the front wall includes a plurality of projections configured to engage with the plurality of apertures on the surface of the tray; and

wherein a graphic pocket is formed by the bottom wall portion, the lip, and the two wall portions.

10. The product management display system of claim 9, further comprising:

two dividers, each of the two dividers extending upwardly from opposite side edges of the tray.

11. The product management display system of claim 9, wherein the pusher mechanism sits on top of and does not extend below the surface of the tray.

12. The product management display system of claim 9, wherein the surface of the tray defines a plurality of openings to permit debris or other materials to pass through.

13. The product management display system of claim 12, wherein the front wall is translucent.

14. A product management display system comprising:

a plurality of trays, each tray having a front rounded portion and a surface defining a plurality of apertures, each of the plurality of trays having two sides;

a lip extending upward from the front rounded portion of each of the plurality of trays;

a front shelf extending forward from the lip of each of the plurality of trays;

a plurality of dividers, each of the plurality of trays having one divider extending upwardly from each of the two sides; and

a plurality of front walls, each of the front walls having a top wall portion, a bottom wall portion, and two side leg portions, wherein the front wall portion, bottom wall portion, and two side leg portions form a wall aperture; wherein each of the plurality of front walls includes a plurality of projections configured to engage with the plurality of apertures on the surface of one of the plurality of trays;

wherein the graphic pockets of each of the front walls form a nearly continuous strip of advertising.

15. The product management display system of claim 14, further comprising:

two wall portions extending from an opposite end of the lip on each of the plurality of front walls,

wherein each of the front walls includes a graphic pocket formed by the bottom wall portion, the lip, and the two wall portions.

16. The product management display system of claim 15, wherein a side of each of the plurality of trays are positioned adjacent a side of another one of the plurality of trays on a shelf.

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